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THE IRON TRADE REVIEW

A Weekly Journal Devoted to the Machinery, Metal-Working and Foundry Trades, and Iron and Steel Manufacture.

VOLUME XXXVII — CLEVELAND, OHIO, JANUARY 28, 1904 — NUMBER 4

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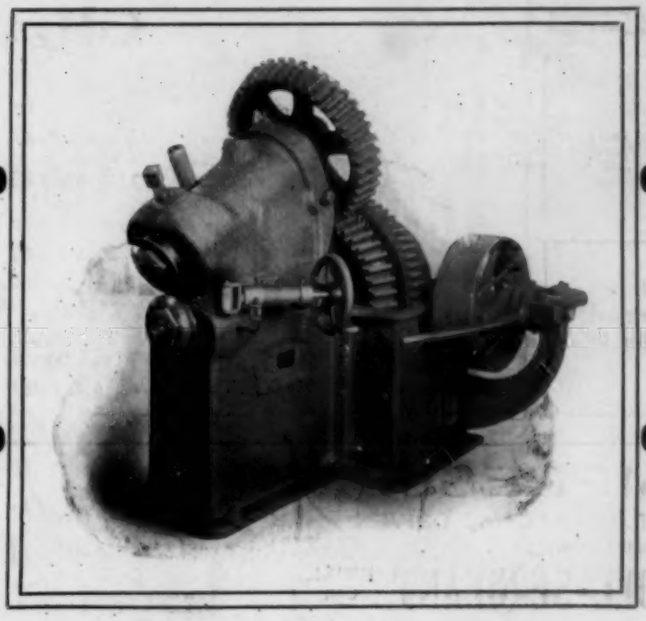

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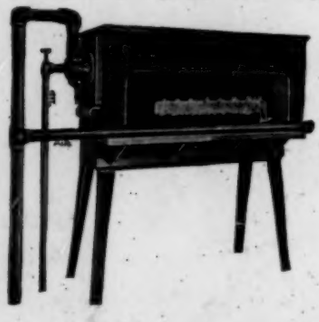

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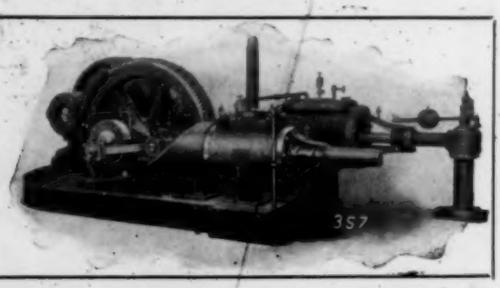

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THE IRON TRADE REVIEW

VOLUME XXXVII CLEVELAND, OHIO, JANUARY 28, 1904 NUMBER 4

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The meeting in New York this week of the presidents of three Southern furnace companies has attracted much attention. Its outcome was the expected one. The experience with the last association made it certain that no similar movement would secure the support of one company, at least, and after a serious and prolonged effort to adopt a new plan, better proof against evasion and price-cutting, the New York meeting adjourned with the understanding that each company would go its own way. A proposal for merger was discussed, but that involves many questions which would mean weeks, possibly months, for a consummation. That the United States Steel Corporation had any part in the negotiations or seeks to acquire Southern properties can be denied. The present problem of Southern furnaces, unlike that of last year, is not so much to keep up prices among themselves as to meet the sharp competition of Northern furnaces. If Southern furnaces should unite to maintain $10 Birmingham for No. 2 foundry iron it would mean that practically all business north of the Ohio and Potomac would go to Northern furnaces. If any agreement is attempted on foundry iron it would need to be as general as the movement of early 1899, in which nearly all the furnaces in the country producing non-Bessemer iron participated.

The past week has been a repetition of the previous one in respect to low prices for Northern irons. While $12.50 at furnace for No. 2 foundry iron is minimum with most furnaces on business in naturally tributary territory, this price is cut where business is sought in more distant territory, and $12 at furnace has been shaded in a few such instances. There is only a moderate demand for foundry iron, east or west, and with some increase in production in January the outlook is for a further increase in stocks by the end of the month. In Bessemer iron a decided increase in active producing capacity is noted, in consequence of increased operation of steel works, but iron from merchant furnaces will not be needed for months, from present indications.

The demand for finished material does not widen greatly, though there are some hopeful indications, and certainly a more optimistic sentiment, though this view must leave out of the account the railroad situation as it stands today. The heavy movement in wire products has subsided for the present, with expectations of further strong buying in early spring. The bar trade is still fairly active and added firmness has been given to prices by the closing down of two plants tributary to the Chicago market. A better scrap market, with advancing prices, has aided in maintaining prices on bar iron. Indeed, the increased stir in old material has been the basis of a good many predictions of improvement. In the Pittsburg district the market for heavy melting steel is quieter, after a good movement.

Good promise for structural material appears in several directions. Chicago notes a contract the past week, with other business in prospect. Three Pittsburg projects, regarded as certain, will require 15,000 tons. In addition to recently reported D. L. & W. bridge work, is a contract for 2,000 tons let to the Fort Pitt Bridge Co., Pittsburg. The holding up of rail business by the railroads is the most important feature of the whole situation, and no move toward the breaking of the deadlock appears as yet. The buying of other material that would follow the placing of large rail orders accents the importance of this feature of the situation. Until it develops, prophecy concerning the iron trade for 1904 is largely guess work. The effort of the re-rolling mills to advance light rails has failed, the large steel mills quoting lower prices. An increased output of light rails from the mills ordinarily operated on standard sections has interrupted the program of the re-rolling mills, and they have been further hampered by an advance to $15 in the price of re-rolling rails held by the railroads.

The sheet market shows further shading of prices and it is difficult for independent producers to make a profit, with No. 28 black sheets selling openly at 2.25c, while as low as 2.20c has been reported. Tin plates have been reduced 15 cents a box for 100-pound coke plates, or to $3.45. The $3.60 price has been maintained since early November.

The pool price on Bessemer steel billets has been shaded on Central Western sales made from the Ashland, Ky., district, and there are reports of cuts of $1 to $2 a ton on open-hearth billets in Northern Ohio. The Clairton Steel Co. is said to have maintained pool prices thus far. Reorganization plans for this company are under way and its sale to the steel corporation is again discussed.

While Lake Superior ore prices for 1904 are not likely to be fixed for some weeks, there has been some sounding of the furnace trade by interests which may not be parties to any agreement on output and prices, particularly on old-range non-Bessemer and Mesabi ores, in the coming year.

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
429 PARK BUILDING, Jan. 27.

In finished lines the market has not shown any decided change from conditions prevailing a week ago, new business continuing light, although specifications on old contracts are on a par with those received during the past two weeks. Northern foundry iron is somewhat weaker, and prices have about reached cost levels at some modern stacks, while merchant furnaces with obsolete equipment are entirely out of the running. The heavy buying in the wire and wire nail trade to cover spring requirements has about come to an end, and further movement is not looked for until present contracts are nearly filled. The buying in these lines, however, during the past four weeks has been on a large scale and some mills will find it difficult to make specified deliveries.

New tonnage both in finished lines and in pig iron during the present month will far exceed that of December, while the output of the furnaces in the Central West will also show some increase. From present indications, the February output of pig iron in this district, where pig iron production has been greatly curtailed, will exceed that of January, owing to the number of stacks that are now preparing to resume during that month. Since the first of the year the Carnegie Steel Co. resumed operations at 17 idle stacks, while two merchant furnaces were placed in operation in this and the Valley districts. Five merchant furnaces are preparing to blow in within the next two weeks, and one at West Middlesex will resume about March 1.

Despite the heavy stocks of ore in furnace yards and at lower lake ports, which will no doubt carry many consumers to September next and close to the end of the year unless there is a large increase in pig iron production over the present, representatives of ore producers

have been in the city the past week feeling the trade on purchasers for the coming ore year. No prices have yet been quoted, but it is the consensus of consumers that the prices of 1901 should prevail for the coming season. This would place desirable Mesabi Bessemer at $2.75 to $3, as compared with $4 for 1903; Mesabi non-Bessemer, $2.35 to 12.65, as compared with $3.20 in 1903; old range non-Bessemer, about $3, and old range Bessemer, $4 to $4.25. Whether there will be an agreement this year on the prices and output of Mesabi ores, and of non-Bessemers of all ranges, is questionable. From present indications several concerns that were parties to the agreement last year will not be in it this year, and with the small amount of ore that will need to be purchased by independent consumers to go round, there will no doubt be keen competition to secure the business.

Another reduction in tin plate has just been announced by the American Tin Plate Co., having gone into effect on Monday, Jan. 25. It amounts to 15 cents a box and 100-pound coke plates are now quoted at $3.45 f. o. b. nearest mill, Pittsburg district. The last reduction was made on Nov. 16, 1903, when the price was reduced from $3.80 to $3.60.

Pig Iron.—The foundry iron market is somewhat weaker and prevailing quotations of good makes of No. 2 range from $13.60 to $13.85, Pittsburg, though $12.50 at Valley furnace, equivalent to $13.35 Pittsburg, has been done on some irons. Carload lots are placed at $13.85, while 100-ton lots can be placed at prices ranging from $13.60 to $13.75. We note the sale of two lots of forge iron amounting to 2,200 tons at $13, Pittsburg. Valley furnaces are not disposed to shade this price, as at present costs they would actually incur a loss by selling below. There have been no transactions in Bessemer, while basic is held at $13.60 to $13.75, Pittsburg. That the condition of trade is gradually growing better, however, is indicated by the resumption of furnaces since the first of the year. The Carnegie Steel Co. has blown in 17 as follows: Edgar Thomson, seven; Carrie, two; New Castle, Pa., two; Sharon, Pa., one; Youngstown, O., one; Bellaire, one; Mingo Junction, O., one; Isabella, Pittsburg, two. In addition the Neville Island furnace of the American Steel & Wire Co. is preparing to go in next week. Two merchant furnaces have gone in during the week—at Girard, O., and at Sharpsville, Pa.; Corrigan, McKinney & Co.'s furnaces at Scottdale, Pa., and Cleveland, O., will be on next week, as well as Mabel at Sharpsville, Pa., and Alice at West Middlesex, Pa.; Clinton, Pittsburg, will blow in within the next 10 days or two weeks and Fannie at West Middlesex will no doubt be ready to start about March 1. Low-phosphorus pig iron has again advanced in price, 1,000 tons having been sold during the week at $19, Pittsburg. This advance is due to the withdrawal of the largest producer from the market, as its entire supply of ores for this iron brought down last season has been exhausted. We revise quotations as follows:

Bessemer, Valley	$13 00 to 13 25
Bessemer, Pittsburg	13 85 to 14 10
No. 1 Foundry	14 00 to 14 25
No. 2 Foundry	13 60 to 13 85
Gray Forge, Pittsburg	12 85 to 13 00
Chilled Basic, Valley	12 75 to 12 90
Chilled Basic, Pittsburg	13 60 to 13 75

Steel.—The steel market continues very quiet, and while there are numerous reports of concessions, business continues to be placed with steel mills at the ruling quotations. So far as can be learned the receivers of the Clairton Steel Co. are quoting the association prices. We make the following quotations: Bessemer and open-hearth billets, 4 x 4 inches, and slabs, up to and including 0.25 carbon, $23, Pittsburg, Wheeling, Valley, Johnstown, Ashland, Ky., Ironton, O., and Lorain, O.; 0.26 and including 0.60 carbon, $1 advance and 0.61 to 1.00 carbon, $2 advance. Billets smaller than 3⅞ inches and sheet and tin bars are $1 per ton extra. Bessemer and open-hearth rods are still quoted at $30, Pittsburg.

Ferro-Manganese.—English producers can now deliver 80 percent ferro at about $44, Pittsburg, but are not absorbing the freight as was the case when the agreement on ferro in this country was in existence. The Carnegie Steel Co., the only producer of ferro for delivery east of the Mississippi, is quoting prices that will take the business from the English manufacturers, therefore the quotation for Western delivery is somewhat higher than that for Pittsburg delivery. Little business is being placed, however, as many large steel producers last year closed contracts for manganese covering requirements during the next two or three years. German, Austrian and Italian producers are also endeavoring to get into this market at the present time, but can hardly meet quotations, which are lower than have ever before prevailed.

Spelter.—Prime Western grades are held at 4.85c, Pittsburg, in carload lots.

Muck Bar.—We note the sale of 500 tons of prime all-pig muck bar at $26, delivered, Pittsburg.

Skelp.—Demand for skelp is not heavy. Grooved and sheared steel skelp is held at 1.45c to 1.50c, and grooved iron at 1.50c to 1.55c, and sheared 1.55c to 1.60c.

Rails and Track Material.—The efforts of the rail rerolling mills to advance the light rail market have not met with any success. The large steel mills are quoting from $23 to $24 per ton and are taking all the business that is being offered. In addition the Carnegie Steel Co. placed its rail mill rolling these sections in operation this week after an idleness of several years, an indication that it is going to seek this buisness more keenly than ever. Furthermore, it is apparent that the light rail mills have made a mistake in endeavoring to advance the market $3 per ton, as was decided at their last meeting, as the railroads having rerolling sections have advanced their prices to $15 flat, and will not sell below this figure. We make the following quotations: Standard sections, 50 pounds and over, in lots of 500 tons and over, $28; car lots and less than 500 tons, $30; less than car lots, $32; 16 and 20 pounds, $23 to $25; 25 to 40 pounds, $23 to $25. Track material: Spikes, 1.85c to 1.90c; track bolts, square nuts, 2.25c to 2.30c; hexagon nuts, 2.40c to 2.45c; fish plates, 1.60c on orders accompanying large rail contracts, otherwise 1.80c to 1.85c is asked.

Plates.—The plate trade continues quiet, although the increased demand from the car works noted a week ago continues. On skelp sizes there is considerable shading. Agreed quotations are as follows: Tank plates, ¼-inch thick and up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.70c; marine, ordinary firebox, A. B. M. A. specifications, 1.80c; still bottom steel, 1.80c; locomotive firebox, not less than 2.10c, and it ranges in price to 3c. Plates more than 100 inches, 5c extra 100 pounds. Plate 3-16-inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra. These quotations are based on carload lots, with 5c extra a hundred pounds for less than carload lots. Terms, net cash, in 30 days.

Bars.—Demand for iron and steel bars continues good, and specifications, while not as heavy as during the first week of the month, are as good as can be expected after the slump that the iron and steel trade has experienced. Iron bars are quoted at 1.30c, Youngstown, although some mills are holding their product at the same figure, at mill, Youngstown. We make the following quotations: Bessemer steel bars, 1.30c; open-hearth, 1.40c; plow beams and cultivator beams, 1.30c, net; channels, angles, zees and tees, Bessemer, under 3 inches, 1.40c; common bar iron, 1.30c to 1.35c, Pittsburg. The following differentials are maintained on steel: Less than 2,000 pounds of a size and not less than 1,000 pounds, 10 cents advance; less than 1,000 pounds of a size, 30 cents advance. Hoops are quoted at 1.65c, full-extras, in 250-ton lots and over, and 1.75c in less than 250-ton lots. Bands are quoted at 1.30c and take the bar extras.

Structural Material.—Tonnage has not been very heavy during the week, although considerable business is being figured on. A large warehouse on the South Side, a new foundry and the Frick hotel will all require a large amount of material, estimated at fully 15,000 tons. We make the following quotations: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees,

1.60c; angles, from 3 to 16 inches, 1.60c; universal mill plates, 1.60c.

Sheets.—While many of the sheet mills are not disposed to shade 2.30c on No. 28 gauge, 2.25c at mill is being done and some business has been taken as low as 2.20c. At these figures an independent mill must absolutely sell at a loss, while the American Sheet & Tin Plate Co. could realize little beyond the profit that accrues to the other subsidiary companies from the sale of the steel. On galvanized there is also some shading. We quote black sheets in 500-bundle lots and over as follows: No. 30, 2.75c; No. 29, 2.65c; No. 28, 2.25c to 2.30c; No. 27, 2.15c to 2.20c; Nos. 25 and 26, 2.10c to 2.15c; Nos. 22 and 24, 2.05c to 2.10c; Nos. 18 and 20, 2c to 2.05c; Nos. 14 and 16, 2.05c; Nos. 10 and 12, 1.75c to 1.80c. Galvanized, Nos. 10 to 17, 2.40c to 2.45c; Nos. 17 to 22, 2.60c to 2.65c; Nos. 22 to 25, 2.80c to 2.85c; Nos. 25 and 26, 3c to 3.05c; No. 27, 3.20c to 3.25c; No. 28, 3.40c to 3.45c; No. 29, 3.80c to 3.85c; No. 30, 4.30c.

Tin Plate.—The American Sheet & Tin Plate Co. on Monday, Jan. 25, announced a reduction on 100-pound coke plates of 15 cents a box or $3 per ton. The base price is now $3.45 for 100-pound coke plates, f. o. b. nearest mill, Pittsburg district. On Nov. 16 last a reduction of $4 per ton or 20 cents a box was made. Since March 2, 1903, when an advance of 20 cents a box was made, tin plate has been reduced $7 per ton. Demand for tin plate at present is said to be equal to the demand at this time last year, but buying at this season of the year is always light. The amount of rebate plate that is being rolled is not heavy, but there is no truth in the report that the Amalgamated Association has been notified not to continue the rebate fund.

Wire and Wire Nails.—Little new business is being placed in either wire or wire nails as the spring buying is practically at an end. The tonnage taken has been very heavy and some mills will find difficulty in making specified deliveries in February and March. Quotations are unchanged as follows: Wire nails, carload lots, to jobbers, f. o. b. cars Pittsburg, $1.85 base; plain wire, carload lots, $1.75, base; barb wire, carload lots, $2.15, base; staples, carload lots, $2 keg. Galvanized, 30 cents extra. Carload lots to retailers are held at 5 cents advance in all lines, and on less than carload lots a further advance of 10 cents is charged. Steel and iron cut nails, carload lots, $1.70, and less than carload lots, $1.75, f. o. b., Pittsburg, plus freight to point of destination. Terms, 60 days less 2 percent off in 10 days.

Pipes and Tubes.—The market continues quiet, although the trade is making inquiry for requirements to cover the spring demand. Discounts in carload lots to consumers, f. o. b., Pittsburg, plus freight to destination according to Tube Rate Book are as follows:

MERCHANT PIPE.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
⅛, ¼ and ⅜ inch	70	60	67	57
½ inch	73	63	70	60
⅝ to 6 inch	77	67	74	64
7 to 12 inch	71	61	68	58

EXRTA STRONG, PLAIN ENDS.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
⅛ to 8 inch	69	59	65	55

DOUBLE EXTRA STRONG, PLAIN ENDS.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
⅛ to 8 inch	61	51	57	47

BOILER TUBES.

	Steel.	Iron.
1 to 1½ inch	42½	39
1¾ to 2¼ inch	55½	38
2½ inch	58	43
2¾ to 5 inch	64½	50½
6 to 13 inch	55½	38

Merchant Steel.—New business is only moderate and the tonnage received by the mills on old specifications is not heavy. We quote as follows: Turned, cold rolled and ground shafting, 52 off in carload lots and 47 percent off in less than carload lots. Tire steel, 1.50c, base; spring steel 1.90c to 2c; toe calk, 1.85c base. Tool steel is quoted 6 cents and upwards, according to the grade.

Old Material.—Demand for heavy melting stock has fallen off considerably, as the mills that resumed during the past few weeks and were short on scrap have covered requirements for the next month or two. Nevertheless the market is firm at $13.50 to $13.75, gross tons, Pittsburg. Rerolling rails are held by the railroads at $15, gross tons, while cast scrap is also slightly firmer at $12, gross tons.

Coke.—On furnace coke the Connellsville producers are not quoting below $1.50, and efforts this week to have this quotation shaded for a large buyer have failed thus far. On strictly Connellsville foundry coke $2.10 to $2.25 is quoted, although a few producers are securing from 15 to 25 cents per ton above this price. An interesting feature of the coke trade this week is the placing of a contract with a West Virginia producer for 150 tons of coke daily for one year, for shipment to Mexico at $1.27 at the ovens. The coke will be shipped to Mexico from Baltimore and will be used by one of the large smelting plants. The number of active ovens in the Connellsville region is being gradually increased, the H. C. Frick Coke Co. having greatly expanded its output in the past 10 days.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1115 MONADNOCK BLOCK, JAN. 26.

The local market has no features of very great interest and there have been no developments of significance in the week under review. There is moderately good demand for finished materials, but pig iron is quiet. The demand for iron and steel products, generally, which was so promising in the first half of the month, is not now in evidence, and such buyers as are in the market are covering only for actual requirements. This statement applies more particularly to pig iron, but in a modified degree is applicable to some forms of finished material. Buyers are acting charily in the matter of covering for future requirements, and there is much dickering with sellers before the order is actually placed.

The local rail mill was not placed in operation last week as previously reported, but it is expected it will start up after the first of February. Seven of the ten furnaces at South Chicago are now in blast, but there are still nine stacks out of a total of eighteen operated by the Illinois Steel Co. idle. The specifications for heavy sections have improved considerably since the first of the year, though the volume of new business is not of equal proportions. This is offset, however, by the active demand for light rails, almost the entire output of Western mills going into immediate consumption. A good tonnage has also been secured in plates, and the local producer now has orders on hand that will keep its plant busy for several weeks to come. Bar iron shows improvement with the closing down of the plants of the Emlyn Iron Works at East Chicago, Ind., and of the American Rolling Mill Corporation at Muncie, Ind., and our quotations of 1.35c to 1.40c are maintained without difficulty. The demand for steel bars is good, though the tonnage is somewhat restricted because of the refusal of mills to accept orders for delivery beyond July of the current year. Structural steel sales during the week include a contract for 1,200 tons for a warehouse to be built in this city by the American Bridge Co. The demand for cast iron pipe is also good, the leading producer having secured the contract for 1,800 tons from the city of Portland, Ore., mentioned a week ago. In scrap iron, prices are firmer and dealers are doing some speculating. Firms with material to sell report that mills are out of the market except at acceptable prices, and that they can generally get better prices from dealers who are stated to be accumulating stocks.

Pig Iron.—The buying of the week has been almost wholly confined to Northern furnaces, Southern producers booking only occasional carload lots. The total tonnage placed, however, is not of proportions warranted to produce much enthusiasm, and it is with difficulty that present prices are being maintained. Some isolated stacks in the South, finding the competition and low prices of furnaces north of the Ohio river too keen to permit them to share

in the business placed and at the same time maintain the present Birmingham basis, have lowered their quotations 25 cents a ton and are now seeking orders at $9.75 Birmingham or $13.60 Chicago. The call for iron at the present time, however, is so slight that there is little encouragement in seeking it at the sacrifice of prices and the leading producers are holding quotations at $13.85 Chicago for No. 2 foundry. Northern irons have not sold in this market as low relatively as is reported from Eastern centers, and $14 for No. 2 is the usual basis. Trading is without life, however, and the tonnage of sales has reached a lower point during the week under review than in any preceding week this year. We quote as follows:

Lake Superior Charcoal	$16 00 to 16 50
Northern Coke Foundry No. 1	14 50 to 15 00
Northern Coke Foundry No. 2	14 00 to 14 50
Northern Coke Foundry No. 3	13 50 to 14 00
Northern Scotch Foundry No. 1	15 00 to 15 50
Ohio Strong Softeners No. 1	16 80 to 17 30
Ohio Strong Softeners No. 2	16 30 to 16 80
Southern Coke Foundry No. 1	14 35
Southern Coke Foundry No. 2	13 85
Southern Coke Foundry No. 3	13 35
Southern Coke Foundry No. 4	12 85
Southern Gray Forge	12 60
Southern Mottled	12 35
Southern Silveries (4% to 6% Silicon)	15 35 to 15 85
Jackson Co. Silveries (8% to 10% Silicon)	18 50 to 19 50
Alabama and Georgia Car Wheel	19 85 to 20 85
Malleable Bessemer	14 50 to 15 00
Basic Iron	14 35 to 14 85

Billets and Wire Rods.—No large sales are reported, the demand being confined almost exclusively to carload lots of forging billets, for which the pool price of $24 is obtained. Open hearth billets from store are quoted at 1.30c. Wire rods, mill shipments, Chicago delivery, $32 to $33.

Iron and Steel Bars.—The closing down of the plants of the Emelyn Iron Works at East Chicago, Ind., and of the American Rolling Mill Corporation at Muncie, Ind., has strengthened the local bar iron situation, and has made the maintenance of the advanced prices a matter of considerably less difficulty. There has been a good volume of buying during the week, all classes of consumers sharing in the movement. The business from railroads has not yet increased to the proportions anticipated, notwithstanding the orders that are reported to have been placed for several thousand cars since the first of the year, but a revival is looked for from this source in the near future. Steel bars are in relatively good demand, though the fact that mills are declining to accept orders for deliveries beyond July keeps the tonnage of sales down. The business in steel hoops and angles continues good. We quote bar iron, Chicago delivery, carload lots, 1.35c to 1.45c, half extras; soft steel bars, 1.46½c half extras, Chicago delivery, carload lots, mill shipments, with 5c to 10c per 100 lb. extra for less than carload lots with the regular extras for less than a ton of a size; angles less than 3 x 3, 1.56½c base, half extras; hoops, 1.81½c, carload lots, full extras. Store business in both iron and steel bars is good, and the former is held at 1.60c to 1.70c base, full extras; and steel at the same price but with full card extras; small angles, channels and tees, less than 3 x 3, 1.70c to 1.80c rates, half extras; hoops, 2.10c to 2.20c rates full extras.

Sheets.—The business of the week shows an improvement over conditions that have existed for some time past, but there is still much uncertainty regarding prices. Orders continue largely for small lots and these usually call for immediate shipment. We quote prices on carload lots, mill shipments, Chicago delivery, as follows: No. 27 black, 2.36½c to 2.41½c; No. 28, 2.41½c to 2.46½c. Galvanized sheets are in better demand, 80 and 2½ percent off being the general quotation, though this might be shaded on a desirable order. Store trade is the brightest feature in the sheet business, jobbers reporting a good demand for all sizes. We quote prices on small lots from warehouse, as follows: No. 16, 2.40c to 2.50c; Nos. 18 and 20, 2.50c to 2.60c; Nos. 22 and 24, 2.55c to 2.65c; No. 26, 2.65c to 2.75c; No 27, 2.75c to 2.85c; No. 28, 2.85c to 2.95c; galvanized, 75 and 7½ percent.

Plates.—The Western mill reports that orders have been coming in quite freely of late, and that it has a tonnage on its books sufficiently large to take up its output for several weeks. We quote prices on mill shipments, carload lots, Chicago delivery, which are without change, as follows: Tank steel, ¼-inch and heavier, 1.76½c; flange steel, 1.86½c. From store on small lots we quote: Tank steel, ¼-inch and heavier, 1.90c to 2c; 3-16, 2c to 2.10c; No. 8, 2.10c to 2.20c; No. 10, 2.15c to 2.25c; flange steel, 2.25c, all f. o. b. warehouse.

Structural Steel.—Some new projects have become public during the week, and one contract calling for 1,200 tons of structural shapes, has been let to the American Bridge Co. The outlook is brighter and the indications point to a good demand during the coming spring and summer. Prices are without change, and we quote mill shipments, Chicago delivery, as follows: Beams and channels, 16 inches and under, 1.76½c; 18 inches and over, 1.86½c; universal plates, 1.76½c; angles, 3 x 3 and larger, 1.76½c; tees, 3 x 3 and larger, 1.81½c; zees, 1.76½c. On lots from store, we quote beams, channels and angles, 3 x 3 and larger, 1.90c rates; 18, 20 and 24-inch, 10c extra; tees, 1.95c rates.

Merchant Steel.—Mills report several small contracts closed with agricultural implement manufacturers. Specifications are coming in freely and the entire output is going into immediate consumption. We quote mill shipments, carload lots, Chicago delivery: Spring steel, 2c; sleigh shoe, flat sizes, 1.60c; concave and convex, 1.75c; cutter shoe, 2.25c to 2.30c; smooth finished machinery steel, 1.71½c base; plow steel, 2.50c and upwards, according to quality; toe calk, 2.01½c to 2.11½c. Ordinary grades of tool steel, 6c to 8c; specials, 12c and upwards. Cold rolled shafting in carload lots, 52, and in less than carload lots, 47 percent discount from list.

Merchant Pipe.—Jobbers and consumers continue to specify in good volume against their contracts and the outlook is one of promise. We quote to consumers, carload lots, mill shipments, random lengths, f. o. b. Chicago as follows:

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Guaranteed Wrought Iron Pipe. Black. Percent.	Guaranteed Wrought Iron Pipe. Galv. Percent.
⅛ to ⅜ inch, inclusive	68.35	58.35	65.35	55.35
½ inch	71.35	61.35	68.35	58.35
¾ to 6 inch	75.35	65.35	72.35	62.35
7 to 12 inch	69.35	59.35	66.35	56.35

Less than carload lots, 12½ percent advance over above prices.

Boiler Tubes.—While the store trade is reported brisk, orders with mills are falling off. Prices are without change and we quote carload lots, mill shipments, Chicago delivery, as follows:

follows:

	L. W. Steel. Percent.	C. C. Iron. Percent.	Seamless Steel. Percent.
1 to 1½ inch	42.35	39.85	53.35
1¼ to 2¼ inch	54.85	37.35	40.35
2½ inch	57.35	42.35	.....
2¾ to 5 inch	63.35	49.85	{ Up to 4 inches.
6 to 13 inch	54.85	37.35	{ 48.35

For car lots or less, direct from warehouse stock:

	L. W. Steel. Percent.	C. C. Iron. Percent.	Seamless Steel. Percent.
1 to 1½ inch	40	35	37.50
1¼ to 2½ inch	50	32.50	35
2¾ to 5 inch	60	45	{ Up to 4 inches.
6 to 13 inch	50	32.50	{ 45

Cast Iron Pipe.—The leading interest has closed a contract during the past week with the city of Portland, Ore., for 1,800 tons of pipe of various sizes. A number of small lots have also been taken, making the week's business of good proportions. We quote carload lots, Chicago delivery, 4-inch water pipe, $27; 6-inch to 12-inch, $26; larger sizes, $25; gas pipe, $1 a ton higher.

Rails and Track Supplies.—Projects for electrical and inter-urban roads appear to be numerous, judged by the large number of inquries sent in for rails. Most of these are believed to be "wildcat" propositions and little business is looked for from them. On the other hand, railroads are specifying freely against contracts already placed, though sending in few supplementary orders. The demand for light rails and track supplies is very brisk, and mills have their entire output of these products taken

up. We quote standard sections, 500 tons and over, $28; less than 500 tons to carload lots, $30; less than carload lots, $32; second quality rails, $27; 25-pound rails, $25 to $27 according to point of delivery; 12-pound rails, $26 to 28, with regular differentials for intermediate sizes. Track supplies, mill shipments: Angle bars, 1.50c to 1.60c; spikes, first quality, 1.75c to 1.85c (out of store, 1.90c rates); second quality, 1.45c to 1.55c; track bolts, 3½ x ¾, with square nuts, 2.40c to 2.50c per 100 pounds; with hexagon nuts, 2.55c to 2.65c, with usual differentials for other sizes.

Wire Products.—Demand for wire nails and all wire products is remarkably good, and the leading interest is unable to keep pace with its orders. All its plants are running to their full capacity, yet the company is falling behind in its shipments. We quote prices to jobbers, Chicago delivery, as follows: Wire nails, carload lots, $2.05; less than carload lots, $2.10; cut nails, carload lots, $1.86½; less than this amount, $1.91½; plain wire, $1.95 carloads, and $2 for less than carload lots; galvanized plain wire, $2.25 in carload lots, and $2.30 in lesser amounts; painted barb wire, $2.35 carload, and $2.40 less than carload lots; galvanized barb wire, $2.65 carloads, and $2.70 less than carload lots. Staples, polished, carloads, $2.20; less than carload lots, $2.25; galvanized, $2.50 carloads, and $2.55 less than carloads. Bale ties 82½ and 5 percent discount f. o. b. Waukegan, Ill., on straight carload lots. Poultry netting, 85 and 5 percent discount from list f. o. b. Joliet or DeKalb with actual freight allowed not exceeding 50 cents per 100 pounds.

Foundry Coke.—The market is quiet and prices are receding. We quote Connellsville, 72-hour foundry coke, $2.15 to $2.25 at the ovens, or $4.75 to $4.85 Chicago. Pocahontas and New River coke range about the same in prices.

Old Material.—Mills are doing little buying at the present time except at prices of their own making. Scrap is firm, however, and has an advancing tendency, dealers generally buying all the material they can get hold of. The shutdown of two bar iron mills in Indiana will undoubtedly have an effect on the scrap market, though as yet there is no evidence of weakening prices. We quote dealers' selling prices, gross tons, as follows:

Old iron rails	$14 50 to 15 00
Old steel rails (mixed lengths)	9 50 to 10 50
Old steel rails (long lengths)	11 00 to 11 50
Relaying rails	24 00 to 24 50
Old wheels	12 00 to 12 50
Heavy melting steel	9 50 to 10 00
Mixed country steel	7 50 to 8 00

The following are selling prices for net tons:

No. 1 R. R. Wrought	$11 00 to 11 50
No. 2 R. R. Wrought	9 50 to 10 00
Shafting	11 50 to 12 00
Dealers' forge No. 1	9 50 to 10 00
No. 1 busheling and wrought pipe	8 50 to 9 00
No. 1 cast	11 00 to 11 50
Heavy cast (300 pounds and over)	8 50 to 9 00
Agricultural malleable	8 25 to 9 00
Iron axles	14 50 to 15 00
Steel axles	12 00 to 12 50
No. 1 boilers, cut	8 00 to 8 50
Cast borings	3 50 to 4 00
Mixed borings, etc.	3 50 to 4 00
Wrought turnings	7 00 to 7 50
Machine shop turnings	7 00 to 7 50
Iron axle turnings	7 50 to 8 00
Steel axle turnings	7 00 to 7 50
Stove plate and light cast scrap	9 00 to 9 50
Old iron splice bars	11 50 to 12 00

CLEVELAND.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, Jan. 26.

While it is not generally expected that prices on old-range ores will be announced before late March or early April, it is understood that several ore producers have been sounding the furnace trade, particularly producers of foundry iron, and in the case of some non-Bessemer ores that are not likely to be included in any agreement for 1904-5, it is possible quotations will be made earlier than above mentioned. However, with a six months' supply of ore in most furnace yards there is no disposition on the part of furnacemen to hurry matters.

It is expected that vessel employes on the lakes will demand the same wages for 1904 as were received in 1903. The engineers adopted the old schedule this week and other unions will probably take similar action at an early date. The Lake Carriers' Association will not be disposed to hasten consideration of the wage question, but will take it up as soon as it feels justified in so doing. At present the outlook for lake business this year is not favorable.

Pig Iron.—Another week of keen competition, low prices and little business has passed. The largest order recently placed in Northeastern Ohio was by a Canton concern a few days ago, when 1,500 tons was purchased. The price is known to have been below $12.50 at the furnace and is said to have been $12. Orders are being taken which do not net the furnaces more than $12 at their plants, and sales have been made at $11.90, as reported last week—these being made by furnaces having the longest haul to points of delivery. However, some buyers have been willing to pay $12.50 at the furnace for favorite brands. Agents of Southern furnaces say that it is impossible to sell Southern iron in the Cleveland district at present prices—$9.75 to $10, Birmingham, for No. 2—except to foundries needing a limited amount of high phosphorus iron for their mixtures. There is, however, no indication that Southern iron will be lower in the near future. We quote as follows for Cleveland delivery, save on Northern gray forge, which is at Valley furnace:

Bessemer	$13 85 to 14 00
No. 1 Strong Foundry	13 50 to 14 00
No. 2 Strong Foundry	13 00 to 13 25
No. 3 Foundry	12 25 to 13 00
No. 2 Southern	13 60 to 13 85
Gray Forge, Valley furnace	11 50 to 12 00
Gray Forge, Southern	11 85 to 12 00
Lake Superior charcoal	16 00 to 16 50

Finished Material.—There is some activity in plates used by boiler makers, safe manufacturers and for tanks, but no orders for vessel plates are being placed, and the prospect for orders from shipbuilding concerns is not bright. In those angles and bars which can be made by re-rolling steel rails, the re-rolling plants are proving troublesome competitors, as they have been buying old steel rails at about $12 and the cost of re-rolling does not exceed $7. Rumors that the price of 1.30c for Bessemer bars and 1.40c for open-hearth, Pittsburg, has been shaded by parties to the agreement cannot be confirmed, but the re-rolling concerns are not included in the agreement. The demand for structural material is light. The demand for bar iron has improved somewhat and it is expected that the price will advance if the higher prices of scrap are maintained. The quotations are still 1.30c Youngstown, by the principal producers and 1.20c at their plants by smaller concerns. Reports indicate that specifications are being received by the principal manufacturer of sheets at such a rate as to keep the mills employed to a greater extent than for some time, but the independents are still actively in the field and are making such prices as are necessary to obtain orders. Prices of the principal producer through jobbers are as follows: Mill sales of black sheets, No. 10, 1.75c; No. 11-12, 1.80c; No. 14, 1.85c; No. 16, 1.95c; No. 27, 2.30c; No. 28, 2.40c; Galvanized, 75, 10 and 7 off. Out of stock prices are as follows: No. 10, 2.10c; No. 12, 2.15c; No. 14, 2.20c; No. 16, 2.30c; No 18-20, 2.40c; No 24, 2.45c; No. 25-26, 2.50c; No. 27, 2.55c; No. 28, 2.65c; No. 30, 3.10c. Galvanized out of stock, No. 16, 75 and 7½ off; No. 18-20, 75 and 10 off; No. 22-28, 75, 10 and 2½ off.

Old Material.—There is much more activity and prices on most kinds of scrap have advanced. There is a strong demand for heavy steel, but dealers are holding for higher prices and sales have not been numerous. We revise quotations as follows for gross tons, Cleveland:

Old iron rails	$16 00 to 17 00
Old steel rails (over 6 feet)	13 00 to 14 00
Old steel rails (6 feet and under)	12 00 to 13 00
Old car wheels	13 00 to 14 00
Steel boiler plates	9 00 to 10 00
Malleable iron (railroad)	11 00 to 12 00
Malleable iron (agricultural)	9 00 to 10 00
Heavy steel	12 00 to 13 00

We quote the following, net tons:

No. 1 R. R. wrought	$12 00 to 13 00
No. 1 busheling	11 00 to 12 00
No. 1 machine cast scrap	12 00 to 13 00
Iron axles	16 50 to 17 50
Axle turnings	9 00 to 10 00
Wrought turnings (free from cast)	7 00 to 8 00
Uncut wrought iron boilers	5 00 to 6 00

Grate bars	8 00 to 9 00
Pipes and flues (clean)	10 00 to 11 00
Tank iron	9 00 to 10 00
Hoop and band iron	5 00 to 6 00
Sheet iron	4 00 to 5 00
Wrought drillings	7 00 to 8 00
Stove plate	8 50 to 9 00
Steel axles	13 00 to 14 00
Cast borings	4 00 to 5 00

CINCINNATI.

Jan. 26

The coke market is easy and quiet with the best brands held at $2.25, while good coke is freely offered at $2.15 and some makes at $2 f. o. b. Connellsville ovens.

Pig Iron.—The business in pig iron has been exceedingly light the past week and the market rules easy in tone. Southern iron is now held at practically prohibitory prices as compared with Northern makes in this territory. The little Southern iron selling is confined to small lots for mixing. The Southern furnaces are still maintaining their asking prices at $10 Birmingham for No. 2 in a general way but there is some Southern iron obtainable at $9.75 Birmingham for quick shipment.

In Northern iron the market has remained quiet, but the week has developed a price basis which is fairly indicative of the policy which is being pursued in the marketing of Northern iron in this territory. The price basis is $12.50 furnace. This applies to nearly all the producing districts. This price, however, may be said to be the maximum and is used as a basis for figuring on quotations when an inquiry for iron comes up. For instance: A stove manufacturer at Piqua, O., bought 600 tons of No. 2 foundry this week at $13.35 Piqua. This price was arrived at by adding $12.50 to the freight rate from the nearest furnace, which was 85c per ton. The nearest furnace, however, did not get the order so that some other furnace shaded its price sufficiently to meet the figure that could be made by the nearest furnace. This is the condition of the market in Northern iron and the instance given is a fair sample of the way the Northern furnaces are competing for business. It is also reported that one Ohio furnace has gone so far west as Peoria, Ill., in competition with Chicago furnaces. The Southern furnace interests are now in the same position that the Northern makers were a few months ago. They are out of the race. Their indifference is accounted for by the fact that they are fairly well sold up for the first quarter of the year and have very little spot shipment iron to offer.

There is another feature in the situation that even at equal prices would operate against the Southern iron. The haul from Northern furnaces to Middle Western points is much shorter and shipments are more promptly obtainable by the melter, the freight rate is less and this saves the paying out of such a large part of the purchase price to the railroad (which does business only for cash as a rule), and the quality of the Northern iron is, with many buyers, regarded as worth a slight premium over the Southern. While Southern foundry grades are fairly well sold up it is remarked in the trade that gray forge and mottled are dull and there is ample supply of these grades available in the South. Current prices f. o. b. Cincinnati are:

Southern Foundry No. 1	$13 00 to 13 25
Southern Foundry No. 2	12 50 to 12 75
Southern Foundry No. 3	12 00 to 12 25
Southern Foundry No. 4	11 50 to 12 00
Southern Foundry No. 1 soft	13 00 to 13 25
Southern Foundry No. 2 soft	12 50 to 12 75
Gray forge	11 25 to 11 50
Northern Foundry No. 1	14 15 to 14 65
Northern Foundry No. 2	13 65 to 14 15
Northern Silvery (8% silicon)	16 15 to 16 65
Southern car-wheel iron	17 50 to 18 00

Finished Material.—An improved demand for iron and steel bars is reported this week and this has been the situation here for the past ten days. Prices for bar iron are reported as strengthening and we advance our quotation accordingly. In sheets, plates, and structural steel, trade is quiet. Iron bars are now quoted at 1.35c to 1.40c f. o. b. Steel bars continue to be quoted at 1.43c base, half extras, with the retail price, 1.75c to 1.90c for iron and steel out of store. Galvanized sheets are being quoted at 75 and 10 and 5 and 2½ percent off. We quote black sheets, No. 27, at 2.45c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 2.90c; No. 27, 2.80c; No. 16, 2.55c; No. 14, 2.45c; No. 12, 2.35c; No. 10, 2.30c. Tank plates are easy and sell out of store at 2c for ¼-inch and 2.10c for 3-16-inch. Beams and channels are quoted at 1.90c to 2c from stock, and angles at 1.90c to 2c for base sizes.

In merchant pipe the market continues quiet and unchanged. There has been some shading of prices by independent mills, but the market is not quotably changed. The outlook for spring trade is good, as building operations so far as out-door work have been much retarded by the severe weather. The following are car lot prices f. o. b. Cincinnati:

MERCHANT PIPE.
(Basing Discounts.)

	Steel Pipe.		Guaranteed Wrought Iron Pipe.	
	Black. Percent.	Galv. Percent.	Black. Percent.	Galv. Percent.
⅛, ¼, ⅜ inch	68.7	58.7	65.7	55.7
½ inch	71.7	61.7	68.7	58.7
¾ to 6 inch, inclusive	75.7	65.7	72.7	62.7
7 to 12-inch, inclusive	69.7	59.7	66.7	56.7

BOILER TUBES.

	Steel Percent.	Iron Percent.
1 to 1½ inch	41.2	37.7
1¾ to 2¼ inch	54.2	36.7
2½ inch	56.7	41.7
2¾ to 5 inch	63.2	49.2
6 to 13 inch	54.2	36.7

Old Material.—The market was quiet and unchanged. We quote:

Old No. 1 railroad wrought, net tons	$10 00 to 10 50
Cast machine and foundry, net tons	10 50 to 11 00
Old iron rails, gross tons	16 00 to 17 00
Old steel rails, gross tons	12 00 to 13 00
Old short lengths, gross tons	10 00 to 11 00
Old iron axles, net tons	15 00 to 15 50
Stove plate, net tons	9 00 to 9 50
Wrought turnings, net tons	6 00 to 6 50
Cast borings, net tons	4 00 to 5 00

PHILADELPHIA.

Jan. 26

While there is slight improvement in some finished lines, the pig iron market continues dull, with no indication of early improvement. It is hoped, however, that the change for the better in financial conditions will have good effect on the iron and steel business.

Pig Iron.—November and December buying has apparently met requirements of buyers and there is now very limited inquiry. Sellers are not disposed to force the market, but have sold No. 2 X foundry at $14.50, although a few sales have been made at $15. We quote: No. 1 X foundry, $15.50 to $16; No. 2 X foundry, $14.50 to $15; No. 2 plain, $14 to $14.50; Southern No. 2 rail shipment, $13.75 to $14; Southern No. 2 on dock, $13 to $13.50; standard gray forge, $13.50 to $14; ordinary gray forge, $12.75 to $13.25; basic, $13.85 to $14.

Finished Material.—The demand is somewhat improved, especially for bars and sheets. The demand from car builders, locomotive works and shipyards has called for a considerable tonnage. Mills are, however, still eager for orders and many of them are running to only half of their capacity. We quote: Best refined bar iron, $1.25 to $1.35; tank plates, steel, $1.73½; angles, $1.50 to $1.60; beams, channels for 15 inch and over, $1.73½.

Old Material.—There is a shortage at some mills and prices generally are higher. We quote: Old steel rails, $12.50 to $13; miscellaneous heavy steel, $12 to $12.25; old steel axles, $15 to $16; old iron axles, $17 to $18; old iron rails, $14.50 to $15.50; old car wheels, $13 to $13.50; choice RR. No. 1 wrought, $15.50 to $16; country scrap, $13.50 to $14.50; machinery cast, $12.75 to $13.50; No. 2 light scrap (forge), $10 to $10.50; No. 2 light scrap (ordinary), $8.50 to $9; axle turnings, $10 to $10.50; wrought turnings, $8.75 to $9.50; cast borings, $6.50 to $7; stove plate, $10.50 to $11; wrought iron pipe, $11 to $11.50; boiler punchings, $14 to $15.

CHICAGO METAL MARKET.

OFFICE OF *The Iron Trade Review*,
1115 MONADNOCK BLOCK Jan 26

The strongest selling metal in this market is pig lead, for which premiums are in some instances being paid for prompt deliveries. Other metals keep their even course and prices are without change. Buyers are showing no disposition to contract very heavily and are covering for their requirements as these are determined by actual wants. We quote lake copper, Chicago, carload lots, 13½c; smaller lots, 13¾c to 14c; casting, carloads, 13⅛c; smaller quantities, 13¼c. Pig tin, carloads, 29½c; lesser lots, 29¾c. Pig lead, 4.40c, carloads, and 4.50c in lesser

lots. Spelter, 4.85c carloads, and 5.10c lesser quantities. Sheet zinc, 5.65c per lb. in carlots of 600-lb. casks, with 20c advance for less than carlots. Antimony, 7½c for Cookson's, and 6½c to 6¾c for Hallett's in small quantities. Nickel, 45c to 60c, according to amount and deliveries.

Old metals are moderately active in sympathy with other forms of scrap, and prices are firmer. We quote copper wire and heavy, $11 to $11.50; light copper, $10 to $10.50; red brass, $10.50; red brass borings, $9.50; yellow brass, heavy, $8.50; yellow brass borings, $6.50; light brass, $6; heavy lead, $4.25; tea lead, $3.85; zinc, 3⅝c; block tin pipe, 24c; pewter, No. 1, 19c.

UNFAVORABLE OUTLOOK FOR SHIPBUILDING.

The *Marine Review*, in its annual shipbuilding edition, which has just been issued, states that at this time a year ago shipyards of the great lakes had orders for 62 vessels, valued at $13,491,500. Now the number of orders in hand is only 25, many of them for small vessels, and the aggregate value only $3,970,500. In the list of a year ago there were 48 freighters, capable of carrying together in a single trip 230,950 gross tons on 18 ft. draught. In this year's summary there are only 10 freighters of a combined capacity of 63,400 tons. In January a year ago the American Ship Building Co. alone had orders for 39 freighters, costing $9,565,000. Now there are only seven freighters of 50,500 tons capacity on their order list and the aggregate value of these is $2,175,000. The American company is building only one passenger steamer. They have under way, however, a very large job of a passenger kind in the lengthening of the side-wheel steamer City of Buffalo at the Detroit works. Important alterations are also being made in the steamers Hanna, Reis and Merida, all large freighters. From these vessels one boiler is being removed in each case and the dimensions of cylinders cut down; this with a view to economy in operation from a fuel standpoint. The Merida is one of a few vessels of the lakes that have engines amidships. Her engines are being moved aft.

Among the independent yards the Craigs have a fair amount of work on hand. They are building two passenger steamers for Lake Michigan service—one for the Graham & Morton Transportation Co. to be named City of Benton Harbor, to run from Chicago to Benton Harbor, and the other for the Indiana Transportation Co. to run from Chicago to Michigan City, Ind. In addition they are to build a cargo steamer 406 feet long for a company in which they are large stockholders, and a steel yacht and a steel tug for themselves. The Great Lakes Engineering Works, Detroit, have one cargo steamer under way for Frank Seither and others of Cleveland, to be named R. W. England. They are also to build a steel floating dry dock 450 feet long as a part of their shipyard equipment and will, when the slips under way are completed, have capacity for building six 400-ft. steamers at once. Johnston Bros., Ferrysburg, Mich., are building a dredge for the United States Government, to be 161 ft. long, 36 ft. beam and 4 ft. deep. Since the last shipbuilding edition of the *Marine Review* the Columbia Iron Works, Port Huron, Mich., has ceased its existence as a going concern. It had completed one steamer, had about finished another and had a cargo steamer under way for Mr. J. C. Gilchrist, with an order on its books for a second one for Mr. Gilchrist when financial difficulties overtook it and it was unable to meet its obligations. The plant is now the subject of litigation.

In merchant work on the seaboard, there is little encouraging to report. On the contrary, the situation is especially discouraging, for there is not a single new order of importance to chronicle. There is not now and has not been for two years and more, an order for a vessel for the foreign trade of the United States. Whatever in that line may be observed in the *Review's* summary of shipbuilding was there a year ago. The two vessels which the New York Ship Building Co., Camden, N. J., is building for the Pacific Mail Steamship Co. —Mongolia and Manchuria—are not new orders. They were taken over while on the stocks by the Pacific Mail Steamship Co., the original contract for them having been let by the Atlantic Transport Co. They were sold to the Pacific Mail Steamship Co. by the International Mercantile Marine Co. when it took over the Atlantic Transport Line. The Missouri, building for the Atlantic Transport division of the International Mercantile Marine service, at the yard of the Maryland Steel Co., Sparrow's Point, Md., was reported in last year's summary, as were also the side-wheel steamer and freighter building at the yard of the Fore River Ship & Engine Co., Quincy, Mass., for the New York, New Haven & Hartford Railroad Co. The Maryland Steel Co., however, has considerable work on hand. It has made a specialty of suction dredges and has secured contracts to build five of them for the United States Government. It is not to be understood, however, that shipbuilding on the seaboard is altogether dead. While the big yards have not had much to do, there is, of course, the continual wastage in coastwise vessels which must be replaced by the product of American shipyards; and the builders of wooden vessels have been fairly busy throughout the year. But the showing is such as to prove that the United States occupies a most ignoble position in the world's output of ships and it will continue to do so so long as it pursues the strange policy of being a protective country which declines to protect one of the most important industries.

Missouri Pacific R. R.'s New Shops.

After a contest extending over several months, participated in by a half-dozen Missouri and Kansas cities, Sedalia, Mo., has been selected by the Missouri Pacific Railroad Co. as the site for its new shops. These works are to be the controlling point for contruction and repairs in the entire Southwestern system. One million to $1,500,000 will be expended in their construction, they will give constant employment to not less than 1,600 men and this force may exceed 2,000. The shops are to be completed by July, 1905. Sedalia contributes a bonus a little in excess of $200,000.

Seymour R. Church, the well known California pig iron merchant, has failed with liabilities placed at $320,000. The principal creditors are leading importers of pig iron of San Francisco. The failure is attributed to overestimating the demand for iron on the Coast and to the general fall in prices.

The United States Court, at Indianapolis, has granted an order of sale for the Wabash Bridge & Iron Co.'s property, including the realty and machinery. The sale is to take place Feb. 13.

The Resek Machine Tool Co., Cleveland, O., has closed its plant and will not again resume operations, at least under the present management. Employes were dismissed, and the shop will be dismantled or sold outright. The company was incorporated about a year ago with a capital stock of $125,000. The venture has not been profitable and stockholders decided to suspend operations rather than invest further. The company is perfectly solvent, the liabilities being $20,000 and the assets $40,000. Charles Zucker, assignee, will conduct liquidation.

The Londonderry Iron & Mining Co.'s blast furnace, Londonderry, N. S., was successfully blown in a few days ago. The company expects to turn out about 150 tons of pig iron per day.

The Laurie Engine Co.'s building, Montreal, Que., was damaged by fire Jan. 6 to the amount of $15,000. The contents consisted largely of patterns.

The Columbia Foundry, Richmond and Harriet streets, Cincinnati, was damaged by fire Jan. 11. Loss $5,000; covered by insurance.

On Feb. 4 the property of the Eddystone Foundry & Machine Co., Eddystone, Pa., will be exposed for public sale. The property consists of foundry and machine shop with extensive equipment of both.

The corporation known as the Pittsburg Shear Knife & Machine Co. announces that its name has been changed to the Heppenstall Forge & Knife Co. The management remains the same.

THE IRON TRADE REVIEW

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JANUARY 28, 1904

18,009,252 TONS OF PIG IRON IN 1903.

Just as this issue goes to press announcement is made by General Manager James M. Swank of the production of pig iron in the United States in 1903, as shown by returns from every blast furnace to the American Iron and Steel Association. The total was 18,009,252 gross tons, of which 1,911,347 tons was anthracite and coke iron, 15,592,221 tons bituminous (chiefly coke), 504,757 tons charcoal, and 927 tons charcoal and coke mixed. The production of Bessemer iron last year was 9,989,908 tons, against 10,393,168 tons in 1902, 9,596,793 tons in 1901, and 7,943,452 tons in 1900. The production of basic iron in 1903 was 2,040,726 tons, as compared with 2,038,590 tons in 1902, 1,448,850 tons in 1901, and 1,072,376 tons in 1900. The production of spiegeleisen and ferro-manganese last year was 192,661 tons, against 212,981 tons in 1902, and 291,461 tons in 1901.

The unsold stocks of pig iron on hand at furnaces on Dec. 31, not including pig iron made by the owners of rolling mills or steel works for their own use, amounted to 598,489 tons, which is in contrast with 49,951 tons at the close of 1902 and 70,647 tons at the close of 1901. At the close of 1900 the total was 442,370 tons.

It is to be noted that the production of pig iron in 1903 was a record output, that of 1902 being 17,821,307 tons, and that of 1901, 15,878,354 tons, each in turn being a new record. In 1900 the production was 13,789,242 tons, in 1899 it was 13,620,703 tons, and in 1898, 11,773,934 tons.

In the first half of 1903 the United States produced 9,707,367 tons of pig iron. The falling off to 8,301,885 tons in the second half was pronounced, but the first half of 1904 will cause a further and severe shrinkage.

PREFERENTIAL RATES IN GREAT BRITAIN.

Some adverse newspaper comment, it may be recalled, followed the request of the steel companies some time ago for special freight rates on steel products for export. Criticism of the sale of material abroad at less than the home market price came along at the same time, the two things being pointed to as unwholesome outgrowths of our tariff system. It is interesting to find that the selfsame question is a live issue in Great Britain. Complaint was lodged by certain large domestic consumers of Welsh coal against the Taff Vale railroad because it had made a rate of 1s on coal sent over its road for shipment out of the country, while the home consumers of the same coal paid a freight of 1s 6d.

We are so often cited to the free and untrammeled trade conditions in Great Britain, by those who want the policy of *laissez faire* to prevail in the United States, that it is interesting to note these indications that nature is not altogether allowed to have her unassisted way even in British trade. The London *Colliery Guardian* intimates that the apparent discrimination against the home consumer is not very blameworthy, since the South Wales colliery owner could never dispose of his steam coal by land sale. This, it may be said, also describes the situation of American steel manufacturers under present conditions at home. Our contemporary adds that there is just a suspicion, however, that the railroads sometimes favor the foreigner because they have the home trader in a corner; he is on their line and cannot get away from it.

But the serious handicap of the British manufacturer in the matter of railroad rates is not so much the discriminations in favor of exports as in the high rates on all traffic. The Midland chambers of commerce are now memorializing the Board of Trade, complaining

> "that the trading interests of Great Britain are most injuriously affected by the discrepancy between the railway rates for the carriage of goods from foreign towns to the sea and the rates charged by railway companies in this country, which discrepancy is so great that it is possible for a foreign trader to send goods from an inland town by rail and sea, and land them at a port in this country at a cheaper rate than such goods can be carried on British railways to the same port over a similar distance."

British railroads, already well loaded with bonds, insisting on rates that will pay dividends, and grudging expenditure for equipment regarded indispensable by progressive American roads, are bound to remain a millstone about the neck of the British manufacturer. Yet in the mind of the *Colliery Guardian* there is even a greater evil than that complained of by Midlands manufacturers. It says: "The matter is still more serious when British railways vie with the foreigner in facilitating the disposal of Continental goods in this country, for the practice is not only economically unsound, but severely and unnecessarily prejudicial to British industry." Here is a repetition of the grievance American tin plate manufacturers had against the railroads some years ago, when Welsh tin plate was shipped into this country and delivered at interior points at a rate far below that charged on a similar haul to domestic shippers.

Going back to the low export coal rate of the railroads of South Wales, we commend to the American worshipers of British fiscal policies this quiet observation of our London contemporary: "To our mind, the significant fact is that the railway companies find it ex-

pedient to make a sacrifice for a trade upon which our grandmotherly Government has thought fit to place a burden in the shape of an export duty."

IRON IMPORTS AND EXPORTS IN 1903.

The report of the Department of Commerce just issued shows that in December 14,719 tons of pig iron were imported, making the total for the year 1903, 599,547 tons. Imports of billets for December were only 1,425 tons, making the total for the year 261,559 tons. December exports include 4,065 tons of billets; 7,522 tons of rails, of which British North America took 2,426, Japan 1,000, and other countries of Asia and Oceanica, 1,800. Total rail exports for the year, 30,656; total billets, 5,445. Iron and steel values were: Imports, December, $1,739,486; for the year, $41,253,333, showing no change for the year, but a drop of over half comparing Decembers of 1902 and 1903. Exports for December were $9,353,950; increase 20 percent; for the year, $20,068,810, decrease 4 percent.

THE STATUS OF THE STEEL CAR.

For the time being the demand for plates for the construction of steel cars lags, but that does not lessen the interest with which the iron trade regards the steel car and its future. There is abundant testimony to the ultimate economies of steel cars and to their advantages in service—facts that argue for a vast increase in their use and that therefore signify much to the iron industry. Up to June, 1902, statistics showed that about 61,000 steel cars had been built by the Pressed Steel Car Co. and its predecessor, and other makes brought the number up to 70,000. By June, 1903, one year later, the Pressed Steel Car Co. had built a total of nearly 100,500 cars of steel or with steel underframes, and the *Engineering News* estimates that there are today 125,000 steel cars or steel-framed cars in service, apart from wooden cars with steel center sills. It is safe to estimate the plates and shapes required for the 55,000 steel cars and underframes built in the twelvemonth indicated at 550,000 tons.

The significance of the above figures is better appreciated, however, in connection with the total of freight cars in the country—1,600,000 cars, apart from those in company service. Only about 8 percent of the freight cars in the United States are built of steel or with steel underframes. The field for the expansion of the steel car industry, and consequently for the increase of steel consumption in the form of plates and, to a smaller extent, of shapes, is one well worth dwelling upon in anticipation, in a time of slack demand like the present.

Experience with the steel car, while not conclusive as to their life, has refuted some of the objections urged against them at the outset. The *Engineering News*, in analyzing the testimony of prominent superintendents of motive power, finds strong support for the claim that for cars of 40 tons capacity and over, under the severe conditions of modern freight service, the steel car has decided advantages both in efficiency and economy. In summing up, that journal says:

> It may be said that the steel car is evidently far beyond the merely experimental stage, and that its use has already disproved some of the objections originally raised against it. But on the other hand it is still open to considerable improvement in design and construction. As to box cars, the advantages of the steel underframe are well established, and a development in the use of steel upper framing may also be looked for. The composite car is still in the experimental stage, and more experience will be required before it can be compared with the all-steel car. As to the use of steel center sills, this seems to be a wise and economical method of construction for wooden cars, in view of the continual increase in car loads, train loads and engine power, and the consequent increase in trouble with the draft rigging and its attachments.

CONSOLIDATION ECONOMIES.

It has been said, in comment on some of the unfavorable developments of the past year in connection with various consolidations, that the argument of economies in operation and in management, with which trust promoters won many investors in 1900 and 1901, was lost sight of in the speculative debauch that followed. It is now brought forward as proof of the insincerity of its promulgators, who are held up as discredited plotters against the pocketbooks of the people. While many of the harsh things that have been written about the star promoters of the lamented speculative boom are well deserved, there should not be too much haste in generalizing about the economies of consolidations. The fact that dividends are reduced or suspended in the case of some of the iron and steel consolidations does not necessarily discredit the claims of large earnings, due in part to savings resulting from concentrated management. It required the coming of just such a time as the present to test the possibilities of a great corporation in the reduction of expenses of manufacture and distribution.

It was said in the beginning that a great consolidation like the United States Steel Corporation would be compelled to maintain a high wage basis, even in times of declining prices; that it would be in so vulnerable a position, particularly on the score of possible tariff changes, that public feeling would be aroused by any attempt to cut wages. The change in conditions has refuted this view entirely. Supply and demand in the steel market and in the labor market have brought a new adjustment, with no upheaval or public ferment. Considering the arbitrary attitude of labor in the midst of prosperity, quiet acceptance of the inevitable in these recent months of depression has been surprising.

But wage reductions are not the economies about which so much was said when the consolidations were forming. What was meant was the saving in the cost of raw materials from the heavy investments in sources of supply possible to a large company; the reduction in expense of administration by dispensing with many high salaried officers; the merging of selling agencies and the reduction in the number of salesmen; greatest of all, the economies made possible by the standardizing of practice and the introduction of the best methods of manufacture and management at all the consolidated plants. While it has been known that progress was made from the very first in all these directions by the management of the steel corporation, much was tolerated in a period of high prices and record-breaking tonnage that could not bear the test of such a search for leaks as has been on in the past four or five months. Just as it took the crucial strain of the panic of 1893 and the years of depression following, to give American iron and steel manufacturers the low costs that enabled them to enter foreign markets with their

products, so we may look to see the trying experience through which the iron trade is now passing develop economies which were not at all possible last year or in the two years preceding. Leaving out wages, very important steps have already been taken in this direction.

The question of the maintenance of dividends on watered stock and the question of the saving possible through concentrated management are alike in this, that definite answers can much better be given after a period of low prices and shortened business has been passed through. Certain it is, that one year like 1904 is more valuable for the ways it compels to be opened up, leading to lower costs, than three years of the most faithful and arduous committee work, such as has been had thus far.

Obituary.

Selwyn M. Taylor, the noted mining engineer, of Pittsburg, met death while exploring the mine of the Allegheny Coal Co., Cheswick, Pa., on Tuesday morning, Jan. 26. He headed the first rescue party of three that entered the mine after the explosion which killed 180 miners, and while exploring the workings was overcome by the deadly afterdamp. Mr. Taylor, in 1895, after a careful investigation of the lower Connellsville region in Western Pennsylvania, pronounced the coal there almost equal to that of the upper Connellsville region and because of his careful investigations the former has developed until it is second only to the upper region of the Connellsville field. He had charge of laying out many of the mines and the erection of the coking plants of the steel companies in this field, also known as the Klondike region. These plants are now operated by the H. C. Frick Coke Co., owing to the merger of the coking properties in the Connellsville region belonging to the subsidiary companies of the United States Steel Corporation. At the time of his death he was president of the National Coal & Coke Co., capitalized at $5,000,000, with $2,500,000 bonds. In addition to developing coal properties in the Indiana and Klondike fields of this State the company expected to erect a coking plant of 800 ovens this year. Mr. Taylor is survived by his wife and a son.

William Hamlin Hiester, treasurer of the Pottstown Iron Co. for many years, died Jan. 14 at his home in Pottstown, Pa., aged 47 years.

A number of holders of common stock of the United States Steel Corporation met in New York Jan. 23 and voted to ask Andrew Carnegie to enter the board of directors as their representative. It was decided to send a delegation of 50 common stockholders to Mr. Carnegie's residence in Fifth avenue to make the request. The committee will call on Mr. Carnegie just before the annual meeting of the corporation, which is to be held April 18.

Receivers H. E. Talbott and W. B. Earnshaw, of the Stilwell-Bierce & Smith-Vaile Co., Dayton, O., have made arrangements to borrow $30,000. They were authorized by Judge Thompson, of the United States court, to do so, and the resumption of operations is expected. The plant has been closed for a week, so that an inventory could be made. Atorneys express the belief that there will be no disagreement among the unsecured and the secured creditors, and that the company will be enabled to fulfill its contracts on hand, which amount to $500,000.

The Southwestern Foundrymen's Association held its regular semi-annual meeting at Oklahoma City, Oklahoma, Jan. 18. The constitution was revised, making owners of machine shops eligible to membership. A resolution was passed authorizing the purchase of 25 carloads each of pig iron and coke. A banquet tendered the visitors by Oklahoma City foundrymen followed the business sessions. The next meeting will be held June 13.

No Agreement of Southern Furnaces.

(Special Telegram.)

NEW YORK, Jan. 27.—Representatives of the Republic Iron & Steel Co., the Sloss-Sheffield Steel & Iron Co., and the Tennessee Coal, Iron & Railroad Co. held a conference at the offices of the first named company in this city yesterday. There were present President A. W. Thompson, of the Republic Iron & Steel Co.; President J. C. Maben, of the Sloss-Sheffield Steel & Iron Co., and D. H. Bacon, chairman of the board of directors and general manager of the Tennessee Coal, Iron & Railroad Co. Besides these principals there were present the counsel for each company. When seen after the meeting President Maben said to your correspondent:

"We talked the entire Southern pig iron situation over. Our company refused to go into any more associations. We were in one once, only to find that the purposes for which it was organized were being nullified daily by some in it. Iron was sold below the agreed price and rather than violate the agreement we piled up 105,000 tons in our yards, which we could have sold at any time at the reduced prices our competitors were accepting. We will go into any selling agency that can be legally organized, but the lawyers say that would be in violation of the Sherman law. The conference ended with each company deciding to go it alone. As to the proposed merger of the three companies, that was talked about, but no agreement was reached. I said the Sloss company was open for any proposition that may be made in the matter, but that it didn't propose to swap securities it knew were good for those about which it knew nothing. If anybody has any merger plan to offer let him bring it along and we will consider it. We have been approached in this direction before, but they couldn't get us to join them."

Bethlehem Steel Co.'s Earnings.

The statement of the Bethlehem Steel Co., showing the results from operations for the year ended July 31, and also for three months ended Oct. 31, 1903, is as follows:

	Twelve mos. ended July 31.	Three mos. ended Oct. 31
Gross sales	$8,739,107	$1,979,483
Net earnings	2,443,446	542,534
Depreciation	242,478	.....
Interest charges	538,437	130,608
Surplus	$1,662,531	$411,926

The mills of the Eleanor Iron & Steel Co., Irwin, Pa., were closed last week for the purpose of a sale on judgments. One of the judgments is for $38,000 in favor of the Liberty National Bank, of Pittsburg, and the other was secured by the Butler Land & Improvement Co., of Butler, Pa for $10,500. The date set for the sale is Saturday, Jan. 30. The company is capitalized at $225,000. Regarding the claim of the Liberty Bank, John Robinsteen, president, said there would be no trouble, but the judgment of the Butler Land & Improvement Co., he says, should be set aside. About a year ago the company planned to remove its plant to Butler, Pa., where three open-hearth furnaces were to be erected as well as a blooming and billet mill. A site of 20 acres was granted by the Improvement company and in addition an advance of $50,000 was to be made to be repaid in bonds or preferred stock later. The capital stock of the Eleanor company was then increased to $1,000,000. The first payment of the Butler company was made but when the second payment became due, amounting to $17,500, the money was not forthcoming. To raise money to pay this amount the name of the Eleanor company, it is alleged, was used.

Official announcement was made in South Chicago, Jan. 25, that the rail and steel mills of the Illinois Steel Co. will start next Monday, Feb. 1. Two blast furnaces have been blown in this week.

Supt. Howard K. Williams, of the hoop mill of the Carnegie Steel Co., at Warren, O., has received orders to resume operations and the fires have been lighted.

CUTS IN THE POOL PRICE ON BILLETS.

(Special Telegram.)

PITTSBURG, Jan. 27.—Pool prices on Bessemer billets for Western delivery are being cut considerably by the largest independent producer. This concern is quoting billets at $21 f. o. b. mill, Ashland, Ky., and with a freight of $1.95 to Indiana points, can deliver at $22.95, while on Chicago delivery $23.60 can be done, as compared with the pool price of $24 delivered. With this competition it is not probable that the pool quotation on Bessemer steel will be maintained. Furthermore outside open-hearth plants are shading quotations from $1 to $2 per ton, one sale having been made at Cleveland recently at $22.50 delivered, as compared with $23.50 delivered, the association price. Emphatic denials are received from Clairton Steel Co. officials regarding their shading of prices. It is now announced that they were never members of the association, never having posted a forfeit, but they agreed to adhere to official quotations and have sold considerable steel in the past two weeks according to the official schedule.

National Tube Co. of Ohio.

(Special Telegram.)

PITTSBURG, Jan. 27.—The National Tube Co. of Ohio is the name of the company that will take over the properties of the Lorain Steel Co., of Lorain, O. This Ohio company is a distinct concern and is not to be mistaken for the National Tube Co. of New Jersey, with headquarters in Pittsburg, which is now erecting a large tube plant at Lorain. The National Tube Co. of Ohio will be one of the subsidiary companies of the United States Steel Corporation, holding the same relation to the holding company as the other subsidiary companies of the corporation. It will have its distinct set of officers but will no doubt be operated in close affiliation with the National Tube Co. of New Jersey.

All of the officers of the American Sheet Steel Co. and the American Tin Plate Co., constituting the American Sheet & Tin Plate Co., are now located in this city, the executive officials and their clerks having arrived last week. Nearly all of the departments are located on the thirteenth floor of the Frick building.

Plans of the Clairton Steel Co.

(Special Telegram.)

PITTSBURG, Jan. 27.—A number of plans are on foot for refinancing the Clairton Steel Co., which is now in the hands of receivers. One plan proposed is to issue additional bonds, which are to be a second mortgage on the property. Another calls for an issue of bonds which will take up the present issue and provide additional working capital. New negotiations with the United States Steel Corporation are on foot looking to the taking over of the property. How far they have progressed cannot be learned.

The New River Mineral Co., of Ivanhoe Furnace P. O., Wythe County, Va., one of the oldest iron furnace concerns in that State, has been placed in the hands of a receiver. The creditors having claims aggregating $300,000 filed a petition to put the concern into involuntary bankruptcy, and F. M. Masters, formerly general manager of the company, was appointed temporary receiver. All of the employes have been discharged, and the property will be sold by the trustee in bankruptcy. The company admits its insolvency and will not oppose the proceedings. The Ivanhoe plant has a capacity of 25,000 tons per year.

The bidders for the new Cambridge (Mass.) bridge, for which the Phœnix Bridge Co., Phœnixville, Pa., was awarded the contract as heretofore mentioned in these columns, were as follows: American Bridge Co., New York, $548,500; Boston Bridge Works, $569,750; Boston Steel & Iron Co., $584,000; King Bridge Co., Cleveland, O., $675,000; McClintic-Marshall Co., New York, $544,000; Pennsylvania Steel Co., Steelton, Pa., $574,000; Phœnix Bridge Co., Phœnixville, Pa., $529,500; Riter-Conley Mfg. Co., Pittsburg, Pa., $739,217; Riverside Bridge Co., Wheeling, W. Va., $666,250.

PERSONAL.

E. H. Lynde, who was connected for many years with the Lackawanna Iron & Steel Co. as Bessemer and rolling mill superintendent, has left the employ of the Lackawanna Steel Co. His plans are not yet announced.

H. L. Sholly, who has been with the Tyrone Iron Co., of Tyrone, Pa., for over 18 years, serving as superintendent and general manager, has resigned his position, the resignation becoming effective Feb. 1.

Garry Levan, who was recently appointed superintendent of the Birmingham, Ala., stacks of the Republic Iron & Steel Co., has resigned.

R. D. Wilkinson, of Youngstown, O., assistant to Jacob Barrett, superintendent of blast furnaces in the Youngstown, O., district for the Carnegie Steel Co., has been appointed superintendent of the company's Niles, O., stack.

Tom Cobb King, a well-known blast furnace operator, who has had charge of a number of blast furnace plants in this country in the past 15 years, will leave for London, Eng., in February, for the purpose of establishing himself as an iron and steel works engineer. It is his intention to secure the work of modernizing some of the out-of-date English plants. He left Pittsburg this week on a trip to the South for further investigation of Southern blast furnace practice, after which he will leave for New York to sail for England. Mr. King is a graduate of the Massachusetts Institute of Technology of the class of 1887, and has had charge of the furnace plants of the American Steel & Wire Co., at Crown Point, N. Y.; Brier Hill Iron & Coal Co., Youngstown, O.; Clifton Iron Co., Ironaton, Ala.; Standard Iron Co., Marietta, Pa., and had charge of the erection of the furnaces of the Sharon Steel Co., Sharon, Pa.

The Wellman-Seaver-Morgan Co., of Cleveland, announces the opening of a Pittsburg office at Room 515, Frick building, in charge of Willard N. Sawyer, manager. This office is opened for the convenience of the trade adjacent to Pittsburg. Mr. Sawyer has been with the company for a number of years, prior to which he was general superintendent of the Tennessee Coal, Iron & Railroad Co.'s steel works at Ensley, Ala.

George E. Day, general sales agent of the Youngstown Iron Sheet & Tube Co., has been elected secretary of the company, and will hereafter discharge the duties of both positions. The office of secretary was formerly held by W. H. Foster, who has retired from active connection with the iron and steel business.

T. H. Bailey Whipple has returned to the Sawyer-Man Electric Co. to the position which he left last summer in order to take a part in the reorganization of the sales department of the Nernst Lamp Co., of Pittsburg. Mr. Whipple was general sales agent with the Buckeye Electric Co., of Cleveland, and held a similar position with the Jandus Electric Co. which was an off-shoot of the Buckeye Electric Co. Early in 1903 he was with the Sawyer-Man Electric Co., remaining until he was called to the Nernst Lamp Co.

J. Edward Swanker, manager and engineer of the Empire Bridge Co., the Albany department of the American Bridge Co., has accepted the position of general manager of the Tees-side Bridge & Engineering Works, Ltd., of Middlesbrough, England. Mr. Swanker will sail for England Feb. 1.

J. F. Vogel has been elected president of the Gendron Wheel Co., Toledo, O., to succeed John Showel, deceased. To fill the vacancy in the directory caused by Mr. Showel's death, President Chas. E. Russell, of the Toledo Carriage Wood Work Co., was chosen.

President C. M. Wicker, of the Dillon-Griswold Wire Co., Sterling, Ill., has appointed H. C. Wicker general manager of the plant and Robt. McCosh assistant treasurer.

Capt. Henry Jewell has severed his connection with the Oliver Mining Co. (U. S. Steel Corporation), at Ishpeming, Mich., to become superintendent of mines of the Salisbury Steel & Iron Co., with headquarters at Salisbury Center, N. Y.

Carl Lunkenheimer, of the Lunkenheimer Co., Cincinnati, has sailed for Europe on a four months' trip.

No. 1 blast furnace of the National Tube Co., at Lorain, O., was blown in Jan. 25 and No. 2 will be blown in next week.

ANDREW CARNEGIE RELIEF FUND.

To employes of the Carnegie Steel Co., Pittsburg, Pa., and its constituent concerns there was paid during the past year $180,652.17 from the Andrew Carnegie relief fund. The statement of the disbursements was posted at all the works, mines, railway headquarters and shops of the company last week. This report covers the second year of the operation of the fund. In 1902 the disbursements amounted to $48,213.85. The big increase is due partly to the growth of the understanding of the plan among the employes and partly to the fact that within the past year the scope of the fund has been widened to include all the new Carnegie Steel Co., which comprises the Carnegie Co., the National Steel Co., and the American Steel Hoop Co.

The following table summarizes the operations of the fund:

	1902.		1903.	
	Cases.	Amount.	Cases.	Amount.
Accident	257	$19,700.90	2,791	$106,655.37
Death	113	16,316.00	208	46,824.00
Pension	133	12,196.95	211	27,172.80
Totals	503	$48,213.85	3,210	$180,652.17

It will be seen from this summary that there were included for the past year in the operations of the fund 3,210 beneficiaries, or more than six times the number of the year before, the total then being 503.

The Carnegie relief fund was founded by Mr. Carnegie on March 12, 1901, when he addressed a letter to the president and directors of the Carnegie company, as it was then termed, offering to create a trust for relief purposes. The fund was to consist of $4,000,000 in 5 percent Carnegie company bonds, which would be applied "to provide for employes of the Carnegie company, in all its works, mines, railways, shops, etc., injured in its service, and for those dependent upon such employes as are killed," and "to provide small pensions or aids to such employes as after long and creditable service, through exceptionable circumstances, need such help in their old age, and who make good use of it."

The board promptly accepted the offer and on Jan. 1, 1902, established the Andrew Carnegie relief fund to administer the trust in the lines laid down by Mr. Carnegie, the governing power being placed in the hands of an advisory board. This body is now composed of Charles L. Taylor, chairman; H. J. Lindsay, vice chairman; A. R. Hunt, D. G. Kerr, Thomas Lynch and E. H. Utley. The executive officer of the fund is F. M. Wilmot, manager, who also acts as secretary of the board.

The board established regulations under which the fund has been controlled. Three classes were created—accident benefits, death benefits and pension allowances. Accident benefits are for employes injured while on duty, commencing 14 days after the date of injury. The rate is 75 cents a day for unmarried men and $1 a day for married men, the latter getting an additional 10 cents a day for each child under the age of 16 years.

These benefits are paid for 52 weeks at these rates, and thereafter at half rates. Payments are made at the end of each month for continued cases; for short periods the payment is made as soon as the amounts are ascertained through the office of the employing officer.

Death benefits are payable to the dependent families of employes killed or dying from injuries received on duty. For married men the rate is $500 for the widow and $100 for each child under the age of 16 years. For unmarried men $500 is paid to the relatives, provided that the deceased was the sole supporter or a regular contributor to the support of such relatives. Death benefits are not payable in excess of $1,200.

Pension allowances are payable to employes of companies which have been within the Carnegie interests for 10 years, who have reached the age of 60 years, and who have been at least 15 years in the employ of one or more of the affiliated companies, provided that on medical examination they are not found able to work any longer; also to employes who are totally and permanently disabled before reaching the age of 60 years, provided they meet all the foregoing conditions.

The allowances are based on the length and value of the employe's service, for each year of service 1 percent of the average regular monthly pay for the entire term of service being paid. Such beneficiaries must retire from and cannot re-enter the service of the company, but they may engage in any other business if they so desire.

Employes have no legal right to benefits or allowances, they being gratuities made possible by Mr. Carnegie's generosity, and are therefore exempt from attachment, assignment or other legal process. All employes and their families have the privilege of application to share in the fund. The trust is not a "charity fund" to be used to relieving the wants of employes who may be in need, but is a "trust fund," to be administered according to the conditions laid down in its creation. A year ago the advisory board distributed $48,213.85. Since then Mr. Carnegie enlarged the scope of the fund by changing the original stiuplations so as to include all works, etc., owned, operated or controlled by the constituent companies of the Carnegie Steel Co., the enlargement to date from Jan. 1, 1903.

On April 1 the effect of this was seen by the merging of the Carnegie Co., the National Steel Co. and the American Steel Hoop Co. into the Carnegie Steel Co. Then followed the merging of the Smith-West Connellsville Coke Co., the American Coke Co. and the Continental Coke Co. with the H. C. Frick Coke Co. This made beneficiaries of the fund out of the employes of the Carnegie Steel Co., Carnegie Natural Gas Co., Pittsburg Limestone Co., Ltd., H. C. Frick Coke Co., Oliver Iron Mining Co., Regent Iron Co., Lake Superior Iron Co., Bessemer & Lake Erie Railroad Co., Union Railroad Co., Pittsburg Steamship Co., Pittsburgh & Conneaut Dock Co., Union Supply Co., and Mingo Coal Co. On Jan. 1 another increase came when the Minnesota Iron Co. was merged with the Oliver Iron Mining Co., but this will not show for another year. The growth that has taken place is shown by the fact that only 23 accounts were shown in the report of 1902 while 119 are shown in this year's statement.

The maximum income of the fund is $200,000 a year so that there will never again be as large an increase in the disbursements as is the case this year. The work of this great trust is not fully understood by many of the people who are entitled to be its beneficiaries, but the growing interest in it is leading to a better knowledge of the scope of Mr. Carnegie's generosity. On this account it is expected that there will be an increased number of applications during the coming year from those whose situation brings them within the lines laid down by the founder. If this should be the case it will meet with the wishes of the advisory board whose ambition is to make the trust one of the best administered, as it is the greatest of its kind in the world.

The following table gives in detail the year's disbursements:

DISBURSEMENTS.

WORKS & COMPANIES.	Accident Benefits.	Death Benefits.	Pension Allowance.	Totals
Carnegie Steel Co.—				
Bellaire Works	$ 690 35	.....	.....	$ 69 35
City Mills	3,515 57	$ 2,310 00	$ 9,379 85	15,205 42
Clark Mills	273 95	.....	.....	273 95
Columbus Works	357 00	40 00	.....	397 00
Donora Works	144 60	.....	.....	144 60
Duncansville Mills	64 50	.....	.....	64 50
Duquese Works	9,477 00	5,364 00	831 00	15,672 00
Edgar Thomson Works	11,551 85	9,062 00	5,565 50	26,179 35
General Offices	.....	120 00	.....	120 00
Girard Mills	32 25	.....	26 30	68 55
Greenville Mills	103 60	.....	.....	103 60
Homestead Works	23,669 43	10,543 00	2,309 65	36,522 08
Isabella Furnaces	243 20	.....	52 40	295 60
Lucy Furnaces	489 10	780 00	762 80	2,031 90
Mingo Works	1,904 30	60 00	.....	1,964 30
McCutcheon Mills	193 55	.....	.....	193 55
New Castle Works	2,273 05	80 00	.....	2,353 05
Niles Furnace	.....	60 00	.....	60 00
Ohio Works	2,331 95	.....	.....	2,331 95
Painter Mills	302 40	.....	.....	302 40
Sharon Works	257 40	.....	.....	257 40
So. Sharon Works	329 90	40 00	.....	369 90
Union Mills(Y'g'twon)	595 10	.....	105 30	700 40
Warren Mills	11 00	.....	.....	11 00
Zanesville Furnace	24 00	.....	.....	24 00
Totals	$ 58,835 05	$ 28,459 00	$19,042 80	$106,336 85
Carnegie Natural Gas Co	.....	240 00	.....	240 00
H. C. Frick Coke Co.	15,304 05	6,760 00	3,873 45	25,937 50
Oliver Iron Mining Co.—				
Mesabi Range	254 10	.....	.....	254 10
Vermillion Range	7,459 62	1,240 00	.....	8,699 62
Marquette Range	5,704 55	1,300 00	.....	7,004 55
Menominee Range	3,813 65	80 00	.....	3,893 65
Gogebic Range	9,065 20	1,370 00	.....	10,435 20
Totals	$ 26,297 12	$ 3,990 00	$.....	$ 30,287 12
Bessemer & L.E.R.R.Co.	3,458 30	4,140 00	.....	7,588 30
Union Railroad Co.	1,631 10	1,860 00	.....	3,491 10
Pittsburg & Conneaut Dock Co.	1,063 75	960 00	.....	2,023 75
Union Supply Co.	60 00	.....	.....	60 00
Keystone Bridge Works	.....	235 00	4,256 55	4,491 55

Beaver Falls Mills		180 00	.....	180 00
Totals for 1903 ....$106,655 37	$46,824 00	$27,172 80	$180,652 17	
Totals for 1902 .... 19,700 90	16,316 00	12,196 95	48,213 85	
Grand totals...$126,356 27	$63,140 00	$39,369 75	$228,866 02	

CHARACTER OF CASES FOR WHICH RELIEF WAS GRANTED.

KINDS OF CASES.	Active Dec. 31, 1903.	Active Dec. 31, 1902.	Inactive Dec. 31, 1903.	Inactive Dec. 31, 1902.	Totals Dec. 31, 1903.	Totals Dec. 31, 1902.
Accident	284	48	2507	209	2791	257
Death	168	106	40	7	208	113
Pension	189	130	22	3	211	133
Totals	641	284	2569	219	3210	503

German Steel Consolidation Fails.

Telegrams from Berlin announce that the conferences held at Cologne last week in an attempt to organize all the great German steel companies into a syndicate have resulted in failure. The conferences succeeded in splitting the steel industry into two groups, the first of which included the manufacturers of half-finished goods, girders and other simple structural forms, while the second is composed of the manufacturers of steel rails and other railway material. The second group embraced the 16 prominent companies which took the lead in trying to effect the general organization. These companies have now decided to hold together and to begin a price war upon the companies who refused to accept the terms offered for the general steel syndicate.

The outside companies include such important establishments as the Krupp Gun Works, the Bochum Cast Steel Co., the Westphalian Steel Works, the Hasper Co., and all the Silesian manufacturers. Another meeting will be called for Feb. 5, when the first group of manufacturers will invite all the outside makers of half-finished steel and girders to join in a movement to compel the second group to come to terms. It is expected that this war of prices will be carried into outside markets and that it will result in lower prices for German steel products than ever before.

Salisbury Steel & Iron Co.

At the annual meeting of the shareholders of the Salisbury Steel & Iron Co., Utica, N. Y., the following directors were elected to serve for the ensuing year: Henry N. Clark, Boston; William Kerby and J. E. Morhardt, New York City; E. L. Wells and W. H. Switzer, Utica; Hon. Titus Sheard, Little Falls, N. Y.; Judson W. Warner, Oneida, N. Y. The officers elected were: J. W. Warner, president; Henry N. Clark, vice president; Wm. H. Switzer, secretary and treasurer; F. R. Switzer, assistant treasurer. Marcus Ruthenburg was reappointed as consulting engineer. This company was organized for the purpose of opening up the extensive magnetic deposits in Salisbury, Herkimer Co., N. Y., as shipping mines. During the past year considerable development work has been done in sinking shafts and drawing levels preparing for extensive mining. The operations throughout have been in solid ore running 63 percent to 64 percent metallic iron, free from titanium, and running low in sulphur and phosphorus. The company has recently acquired additional mineral lands, so that it now owns outright nearly 800 acres. The Salisbury mines are almost in the center of New York State and are connected with the main line of the New York Central railroad by a short standard gauge road. Shipments on contracts are expected to begin in the latter part of February.

Wm. H. Holcroft & Co., engineers and contractors, Chester, Pa., have secured a contract with the Brylgon Steel Casting Co., of New Castle, Del., as follows: One steel stack, 100 ft. in height; two brick buildings complete, engine and boiler house; one frame building complete, bench molders' annex; drying ovens and core ovens complete. They have recently constructed a 25-ton acid open-hearth furnace for the Seaboard Steel Casting Co., of Chester, Pa., and it is making an excellent record.

As a result of the breaking of a governor belt, allowing an immense flywheel to run away and burst in the Cambria Steel Co.'s No. 2 rail mill, Johnstown, Pa., Jan. 21, three men were killed and nine were injured. The property loss was about $10,000.

A NEW METALLURGICAL PUBLICATION.

We have before us the first number of the *Iron and Steel Metallurgist and Metallographist*, to be published monthly by Sauvens & Whiting, of Boston, as success to the *Metallographist*, a quarterly, which last year completed its sixth volume. The *Metallographist* has done such excellent service in the field of microscopic study of the structure of metals, that its projectors have felt encouraged to undertake the larger work involved in a magazine covering the metallurgy of iron and steel. The first number contains 124 pages of reading matter, the type measurement of the page being 4 x 6⅝ inches. The special contributions are an article on "Iron and Steel Alloys," by R. A. Hadfield, Sheffield, Eng.; one on "By-Product Oven Gas and Tar as Fuels for the Open-Hearth Furnace," by David Baker, until recently general manager of the Dominion Iron & Steel Co., Sydney, Cape Breton; and one entitled "A Problem in the Metallurgy of Cast Iron," by Dr. Richard Moldenke. Other interesting articles are taken from technical journals or from the proceedings of technical societies. In two instances, namely, on pages 42 and 43, credit is given to a journal which reprinted the articles from their original source, rather than to the journals in which they originally appeared. One department of the magazine likely to prove of value is that in which abstracts are given of recent articles of interest to iron and steel metallurgists; there is also an article on the commercial aspects of the iron industry, this being promised as a regular feature, a department of statistics of production, and lastly a review of recent patents relating to the metallurgy of iron and steel. The promoters have made a creditable start, and should find an increasing demand for their excellent publication.

Pig Iron Production in Germany in 1903.

The production of pig iron in Germany in 1903 is unofficially reported at 10,085,634, exceeding that of Great Britain for the first time. The British Iron Trade Association figures showed a production of 4,378,998 tons in the first half of 1903, or at the rate of 8,757,996 tons for the year. Germany's pig iron production in 1902 was 8,402,660 tons, so that the increase last year was marked, being no less than 1,682,974 tons. In 1901 the total was 7,860,893 tons.

Elyria Iron & Steel Co.

The Elyria Iron & Steel Co., having recently completed a mill at Elyria, O., for the manufacture of products rolled from old steel rails, is now preparing to re-roll rails into lighter sections. The company has what is considered one of the best equipped plants in the country, consisting of one 20-inch mill and two 16-inch mills, designed by the Wellman-Seaver-Morgan Co., of Cleveland, and built at an approximate cost of $400,000. The plant has a daily capacity of 150 to 200 tons of structural shapes, pipe, tie plates, etc. The company is now figuring on several large orders for light section rails, as it is the intention to go into the manufacture of this product quite extensively.

A Contract for Kentucky Iron Ore.

The Marting Iron & Steel Co., of Ironton, O., contracted last week for 130,000 tons of Bath county ore from the Rose Run Iron Co., Bath county, Ky.

The Frontier Iron Works, Buffalo, N. Y., have been purchased by W. F. Simon, R. C. Palmer and James W. Murphy, who will continue the business under the same name. The purchasers contemplate enlarging the plant in the spring.

The Jeffrey Mfg. Co., of Columbus, O., through its connection with the Ohio Malleable Iron Co., city, is now in the field soliciting orders for high grade malleable castings.

By an error, the well-known Otto Gas Engine Works, of Philadelphia, were referred to in our issue of Jan. 14, in a paragraph on page 55, as the Ohio Gas Engine Co.

The Thomas Iron Co., Easton, Pa., declared a 4 percent semi-annual dividend on Jan. 22, payable Feb. 1.

The Labor Situation.

AGAINST THE ANTI-CONSPIRACY BILL.

Chas. F. Waltz, Secretary of the Employers' Association of Cincinnati, has addressed the following letter to Hon. John J. Jenkins, chairman of the House Judiciary Committee, Washington, D. C., on the anti-injunction and anti-conspiracy bill now before the House committee:

CINCINNATI, Jan. 19, 1904.

Hon. John J. Jenkins, Chairman House Judiciary Committee, Washington, D. C.

Dear Sir:—I have before me a copy of what is commonly known as the Anti-Injunction, Anti-Conspiracy Bill, being a bill to limit the meaning of the word "conspiracy" and the use of "restraining orders" and "injunctions," in certain cases. It appears that your committee will be called upon to give this bill serious consideration. In the name of the employers and the employing interests of this city, and in the name of the great mass of unorganized workmen, whose rights are no less dear because of that fact, and because our interests, our property and our lives would be jeopardized and threatened by the enactment of any such law, I protest against its passage.

It does not seem possible, nor do I believe that it will be possible, that any body of men so representative as our Congress would pass a law of this character. It is, to say the least, one of the most dangerous, one of the most pernicious and one of the most revolutionary legislative measures that have ever been introduced in Congress. It means to legalize all the unlawful measures of organized labor engaged in strikes. It means the legalization of the picket, of the boycott, and of mob rule with all its terrors. It means more than that; it means the nullification of the riot statutes and the destruction of the power of courts to protect persons and property. Its purpose further is to nullify the statutes that are the protection of persons and property in the various states.

An act that would be lawful if committed by one person may be decidedly unlawful when committed by more than one person or a body of persons; and the purpose of this bill is to make the act or acts of a body of persons of the same lawful character as the isolated act of one person, notwithstanding the fact that the combination of several persons may intimidate, coerce, force and compel others to do that which under conditions of no restraint they would not do at all. In other words, it takes all of the unlawful phases out of conspiracies, notwithstanding the fact that the very purpose of such conspiracy is to break the law and to place others under restraint, to compel them to do that which under no circumstances would otherwise be done.

Such a law constitutes the overthrow of the principles of the common law which have existed for generations. It means further the overthrow of the safeguards that legislators in all the years of our history have thrown around society. It is a direct permit, issued by the highest legislative tribunal of the land to men engaged in what amounts to civil warfare—for strikes as conducted at present are nothing less—to intimidate, to coerce, to boycott, and to drive, force and threaten men with property, to concede unlawful and wrongful demands; to drive, force and coerce employes engaged in the business of making a living, who do not agree with the strikers on the proposition on which they are striking, to either become strikers themselves, quit work, seek employment elsewhere, or, as a last resort, join the organization that is using such methods. And it is the purpose of this bill to make these disreputable methods legal. By the terms of this measure, Congress is asked to become a party to one of the worst legislative conspiracies ever promulgated.

If you pass this bill you are nullifying the work of our judiciary for a century. The final arbiter of our rights is an unchained judiciary, and this bill proposes to undo the work of the greatest judicial tribunal in the world, that through its great expounders, from Marshall to Fuller, has steadily interpreted the law for all the people, equally and with exact justice to all. You are asked to make a new code of human rights and to make it for a single class at that; for in its last resort this bill is in the interest of organized labor and no other class or kind of people. It is class legislation of the most pernicious type. It is destructive of liberty and the safeguards of a free people.

The labor trust is the greatest trust in existence today. It is a trust that crushes more people than any other combination known to man, and by the passage of this law you give this trust a special privilege in restraining commerce. This one trust, by the terms of this bill, is to be taken out of the restraining power of our courts and it is to be made the special fondling of Congress; and though the courts may enjoin, restrain and compel all other trusts and all other classes and kind of people to abstain from the restraint of commerce, and to obey the law in every particular, yet by the terms of this bill you permit the special class of people, tacitly, at least, named in it, to do the very things that no one else dare do. If this bill become the law, then capital can no longer find a safe channel for investment in manufacturing industries. The protection of the courts will be gone and enterprise will have no safeguard. Men invest their capital in great enterprises because they know that an upright judiciary will protect them in their rights under the law. The power of our courts must not be curtailed. They are the expounders of the decrees of liberty. Long ago an eminent jurist, speaking on this same subject, said:

" * * * Men are willing to embark capital, time and experience therein [referring to industrial enterprises], because they can confidently assume that they will be able to control their affairs according to their own ideas when the same are not in conflict with law. If this privilege is denied them, if the courts cannot protect them from interference by those who are not interested with them, if the management of the business is to be taken from the owner and assumed by, it may be, irresponsible strangers, then we will have come to the time when capital will seek other than industrial channels for investment, when enterprise and development will be curtailed and the factory and the workshop subject to the uncertain chances of cooperative systems."

Had the jurist who so ably expounded the law on the subject as above quoted been speaking of the very bill before you, he could not better have stated the just opposition to this measure. The constitution of our country, the decrees of our court, the tenets of our liberty, are all violated by this most pernicious measure. It remains to be seen whether after more than a century of liberty and progress we as a people shall be compelled to retrograde, because of the legislation of our representatives in Congress. I do not believe that your committee will ever recommend this bill for passage. It certainly ought never to pass beyond the confines of your committee room.

The employers of the country, the people who have money invested in manufacturing and industrial concerns—nay, more, 85 percent of the laboring class who do not belong to labor organizations and who must live—these classes are looking to you to prevent the passage of a measure of this character.

The passage of this bill would be one of the greatest strides towards socialism that has ever been made in this country. I do not believe that our Congress is composed of socialists, nor do I believee that they will vote for a socialistic measure.

I hope you will use your personal influence to defeat this measure before it reaches the House.

Trusting that you will give this bill earnest and patriotic consideration, and bespeaking in advance your consideration for all the people and not any one class, I am,

Yours very truly,

CHAS. F. WALTZ,
Secretary.

THE WORCESTER, MASS., LABOR BUREAU.

In the January Bulletin of the National Metal Trades Association, C. E. Hildreth writes as follows of the work of the labor bureau maintained by the manufacturers of that city who manufacture machinery and tools:

"The Worcester Bureau has been in existence since June and has enrolled 5,000 men employed by members and over 2,300 applicants for positions. Many of the applicants have been located, while, due to the present time of depression, still there are a larger number unemployed. Many of the manufacturers who first considered the scheme a good one, but thought that it would be of no use to them individually, now

give instructions to their foremen to hire no help, as the convenience of calling up the Labor Bureau and having men sent to them with experience in the class of work they desired, has satisfied them of the great value. It is found that men of large business experience, as mechanical engineers, technical school graduates and clerical men with wide experience have seen fit to avail themselves of the opportunity to get in contact with the manufacturers. Concerns in other lines of business than metal manufacturing are considering the advisability of joining the association for the benefits to be derived from the bureau.

"Some of the requests made upon the bureau are peculiar but nevertheless of great value to the manufacturer. One concern who had a machine which was of high build, needed a large man with long legs to operate it. The bureau took upon itself the duty of obtaining such and by sending notices through the mail the man was obtained. Another unique although actual experience was where a concern wanted a man with short legs so as to use a machine where a tall person could not do the work. Again the bureau took the responsibility from the concern and found the man adapted to the business.

"As time goes on the concerns realize more strongly the great value to be derived, and new concerns are every day availing themselves of the office, and it is hoped that employers all over the country will see the value to the extent of locating bureaus in their own communities."

AMALGAMATED ASSOCIATION WAGE ISSUES.

The Amalgamated Association of Iron, Steel and Tin Workers declared strikes this week at the plants of the Parkersburg Sheet & Tin Plate Co., Parkersburg, W. Va., and the Muskingum Valley Iron & Steel Co., Zanesville, O. At both plants the employes have accepted concessions greater than those allowed the sheet mills on Jan. 1. It is doubtful if the association will be able to carry on strikes at these plants to a successful finish, as many of the employes are willing to accept the reductions offered in order to secure continuous employment.

The strike of the association at the Pittsburg Steel Co. continues in force, while the plant of the Canonsburg Sheet & Tinplate Co. remains idle for the reason that the concessions the concern asks for cannot be granted.

The employes of the New Haven Iron & Steel Co., New Haven, Conn., have referred the differences with their employers to the officials of the Amalgamated Association. They were locked out on Dec. 19.

The tonnage men employed by Spang, Chalfant & Co., Pittsburg, Pa., who have been on a strike against proposed reductions, have organized a lodge of the Amalgamated Association and the strike is now being carried out through the headquarters of the association.

Trouble has also developed at the Stark Rolling Mill Co.'s plant, Canton, O., and it is probable that the employes of this concern will break away from the Amalgamated Association entirely in the near future.

Suggestions for scale changes to be considered at the convention of the Amalgamated Association to be held in Cleveland are to be in the hands of Secretary Williams no later than March 16. Notices have been sent to all the lodges of the Amalgamated Association to forward the changes they desire discussed in convention no later than this date.

WILL OPPOSE ANTI-INJUNCTION AND EIGHT-HOUR BILLS.

The executive committee of the National Building Trades Association held a three days' session in Chicago last week. Among the subjects discussed were the Grosvenor "Anti-Injunction" or "Anti-Conspiracy," bill now pending before the House Committee on Judiciary with public hearings thereon set for Feb. 25, 26, and 27, and the "Eight-Hour Labor Bill," which is before the House Committee on Labor, with a hearing fixed for Feb. 4.

The anti-injunction bill exempts labor unions from prosecution under the anti-trust bill, and is intended to prevent the issuing of injunctions against the unions. It is backed by the American Federation of Labor and all labor unions, and has passed the House of Representatives three times, in each case dying in the Senate. The eight-hour labor bill is designed to prohibit work on any Government contract from being prosecuted more than eight hours a day, even in the shops of subcontractors. It is the intention of the association to prosecute a vigorous fight against both these bills, and at the meeting of the executive committee a line of action was mapped out and the campaign against these measures will be immediately inaugurated. An effort will be made to enlist in the opposition every association of employers in the building trades in the United States.

LABOR UNIONS ENJOINED.

In New York City last week, Justice Dickey handed down a decision in the suits brought by William F. Mills and George R. Driscoll and William Kissam, three employes of the United States Printing Co., to enjoin the company and two labor unions from discharging them because they are not members of a union. The judge is not clear that the employes could succeed in their action so far as the company is concerned; but he enjoins the defendant unions from enforcing the contract, which is complained of by the defendants, until its legality is fought out. Justice Dickey says: "If the purpose of the two unions in their agreements with the printing company was to hamper or restrict the freedom of plaintiffs and the other workmen in pursuing their lawful trade, and, through arrangements with their employes, coerce them to become members of the union organization or lose their positions or be deprived of employment, such purpose is against public policy and is unlawful. The unions cannot arrange a plan of compelling workmen not in affiliation with their organization to join them at the price of being deprived of their employment."

JOHN KIRBY'S NEW YORK ADDRESS.

John Kirby Jr., of Dayton, O., was the principal speaker before the 146th regular meeting of the New York Universalist Club, Jan. 26. He replied at length to the address of John Mitchell, president of the United Mine Workers of America, who spoke on labor at the last meeting of the association. Mr. Kirby reviewed conditions among laboring men from his point, declared that the vast majority of workingmen had been driven into unions through fear, and continued: "What shall be said of the claims of Gompers, Mitchell and other leaders of these destroyers of peace and quiet that the unions are not responsible for these acts of lawlessness, violence and murder? If these leaders are sincere in making such claims, why are they so persistently and strenuously urging Congress to pass that infamous anti-injunction bill, called 'a bill to limit the meaning of the word conspiracy in certain cases?'"

CITIZENS' INDUSTRIAL CONVENTION.

The Citizens' Industrial Association of America has issued its first official bulletin. It says the industrial association has called a convention for Feb. 22 and 23 in Indianapolis to settle upon plans. The call adds:

"This opportunity is taken of urging upon you the necessity of having a large and representative convention so that we may demonstrate to the country that we are sincere in our determination to oppose the closed shop and other socialistic schemes, the triumph of which would mean our industrial ruin. With the hearty co-operation of all the associations that are eligible for membership in the Citizens' Industrial Association of America there can be no doubt that the latter will be able to accomplish incalculable good for the nation."

NATIONAL FOUNDERS' ASSOCIATION.

A meeting of the foundrymen of Buffalo and vicinity, both members and non-members of the National Founders' Association, was held at the Builders' Exchange, Buffalo, Jan. 16. Addresses were made by President Frank and Commissioner Briggs, of the N. F. A., referring to the work the association had done and the plans now being carried out for still further strengthening it. The foundrymen in and about Buffalo are enthusiastic association men and are working as a unit.

President Frank and Commissioner Briggs have planned to visit the various association districts and hold a number of meetings with a view to giving information to non-members

concerning the objects and status of the association and enlist their co-operation. The first meeting will be held at Milwaukee on the evening of Feb. 1. Thence Messrs. Frank and Briggs go to St. Paul for a meeting on Feb. 2. A St. Louis meeting will be held Feb. 3, one at Indianapolis on Feb. 4, and one at Cincinnati Feb. 5. A trip through the East will probably be taken later but definite arrangements have not yet been made. The president and commissioner met the New England foundrymen at the annual meeting of the New England Foundrymen's Association in Boston, Jan. 13, as already reported in these columns.

President Frank and Commissioner Briggs want to be assured that they voice the sentiment of the membership in their official acts and believe that this thorough understanding can be secured in no better way than in visiting the various centers and holding meetings which will bring them in personal contact with every member. Many members do not get to the annual meetings and these sub-district conferences are expected to facilitate acquaintance and lead to harmonious and effective effort. The president and commissioner on their part will become more fully conversant with the needs and status of the foundry interests in the different sections, particularly as these have been affected by the change in business conditions.

NATIONAL METAL TRADES ASSOCIATION NOTES.

The last advices received from the treasurer of the association, F. A. Geier, were dated at Rome.

The president of the association, S. W. Watkins, of Milwaukee, returned home from a trip abroad last week.

Commissioner DuBrul will be in Washington on Thursday of this week to present arguments before the House Committee against the passage of the metric system bill.

The secretary of the association is receiving replies from his letter to the secretaries of local metal trades associations, citizens' alliances, and employers' associations; these advise that all members of these associations will be urged to write letters to Congressmen and Senators against the passage of the anti-conspiracy and anti-injunction bill.

Correspondence in the secretary's office indicates that a number of interesting papers will be read at the annual convention at Philadelphia in March.

The January number of the *Bulletin* of the National Metal Trades Association appears in a new and attractive cover. On its last page is printed the "roll of honor" of the association, containing the names of members boycotted by unions. In accordance with a resolution passed at the Buffalo convention of the association, every member is notified of a boycott on any firm belonging to the association and members in making purchases give the preference to such firms over all competitors until the boycott is declared off. The list at present contains the names of the Chandler & Taylor Co., Indianapolis; Indianapolis Drop Forging Co., Indianapolis, Ind.; Lincoln Iron Works, Rutland, Vt.; M. T. Davidson, Brooklyn, N. Y.; E. B. Hays Machine Co., Oshkosh, Wis.; Norwood Engineering Co., Florence, Mass.; Payne Co., Elmira, N. Y.; Edison Phonograph Co., West Orange, N. J.; Carborundum Co., Niagara Falls, N. Y.; National Sweeper Co., Marion, Ind.; Erie City Iron Works, Erie Pa.

LABOR NOTES.

The strike of molders at Akron, O., was settled Jan. 20 by the men being ordered back to work by Vice President Campbell, of the Iron Molders' Union. The reduction made by the employers makes the minimum wage 26c an hour instead of 29c, but the men are put upon a ten-hour schedule instead of eight hours as before.

Owing to the strike of brass workers in Chicago, owners of a number of brass manufacturing plants are considering the advisability of closing their works permanently. William M. Webster, commissioner for the chandelier manufacturers, states that chandeliers can be purchased in Cleveland and other cities at lower prices than they can be manufactured in Chicago, and that Chicago manufacturers find it more profitable to act as jobbers than to attempt to do any manufacturing under present conditions.

The American Car & Foundry Co. has asked the men in the Terre Haute shops to accept a reduction of about 20 percent in wages to enable the company to fill a contract for the Big Four railroad. The works at present are almost idle.

A. L. Ide & Sons, Springfield, Ill., have closed down the foundry department to their large plant, and have announced that they will use the building for other manufacturing purposes, giving as their reason that they can get their castings made elsewhere cheaper than they can make them in Springfield. For some time there had been reports of friction between the members of the firm and the molders.

The men employed at the Walsh & Weidner Boiler Co., the Lookout Boiler Mfg. Co., of Chattanooga, Tenn., and the Lookout Iron Works, at Batelle, Ala., have gone on a strike. The union leaders claim that the manufacturers have been employing non-union men.

The American Can Co. has made a new agreement with its employes at San Francisco. The working day is to be reduced from 10 to 9 hours. There will be no increase of pay, but the company will pay time and one-half for over-time.

The foundry of the J. I. Case Threshing Machine Co., Racine, Wis., after being closed since last October on account of strike, was opened Jan. 20, and 200 molders resumed work. On Jan. 25 the Dickey foundry, also owned by the Case company, was opened and 50 more molders were given employment. The 1,200 men employed in the several departments will probably be notified to report for work and it is the intention of the company to have the entire plant in operation by Feb. 1. In the settlement of the strike it is understood that concessions were made by both sides. The molders finally decided to sign individual contracts to work for one year, unless prevented by sickness or a desire to accept a position elsewhere. They also agree to work for such piece-work prices as may be mutually agreed upon by the molders and the company. The molders further agree to a strict compliance with printed rules of the company.

A strike of 30 union employes of the Harris Automatic Press Co., Niles, O., in the past two weeks, was accompanied by many acts of violence in which non-union employes, who number 152, were assaulted by strikers and strike sympathizers. The plant is now being operated with non-union men and the strike has proved ineffective.

A strike of polishers at the Fanner Mfg. Co., Cleveland, was started a few days ago, when 20 men quit work. Their places have been filled and the plant is in operation.

The strike at the plant of the American Steel & Wire Co. at Waukegan, Ill., has been settled. The men returned to work Jan. 25.

In the hearing of the application of the Ricard Boiler Co., Toledo, O., for an injunction to prevent union strikers from interfering with the business of the company, non-union men testified that they had been threatened in many ways. One witness testified that a union man threatened that his house would be burned with dynamite. In spite of this evidence Judge Kinkade, of the common pleas court, refused an injunction. The court ruled that "scab" is not an offensive name; that if violence or intimidation is used the police should be notified and that the strikers had the right to picket and solicit non-union men not to work.

The bids of the Pennsylvania Steel Co. and of other steel companies which recently competed for 20,000 tons of steel rails for the Mecca railway, were as follows: Pennsylvania Steel Co., £4 11s 6d per ton; Gutehoffnungshuette Oberhausen, £4 11s 7d; John Cockerill, Seraing, £4 12s 4d; Rheinische Stahl Werke, Meiderich, £4 19s 3d; Krupp, Essen, £5 1s 7d. The difference between the bid of the Pennsylvania Steel Co. and that of the Krupps, about $2.50 per ton, is regarded as significant. Krupp has been regarded as this country's most formidable competitor in the world markets for rails.

Fire, Jan. 20, at the plant of the Shelby Steel Tube Co., Shelby, O., a constituent company of the United States Steel Corporation, caused a loss of $15,000 due to damage to a storehouse and tubes stored therein.

The Genesee furnace of Corrigan, McKinney & Co., at Charlotte, N. Y., will be blown in next week.

LAKE SUPERIOR IRON MINES.

Pickands, Mather & Co. have closed their Minorca mine, near Virginia, Minn., and have pulled the pumps. About 100 men were employed.

The Buffalo & Susquehanna mine, on section 6 T 57 R 20, at Hibbing, Minn., has started hoisting ore from development work at No. 2 shaft. No. 1 shaft is down nearly 200 feet, but little drifting has been undertaken yet. No. 2 is 130 feet deep, and will be dropped to about the level of the other before sinking stops. Drifting will then connect the two. Work on this property commenced 11 months ago. There is in No. 1 shaft a 6-ton hoisting plant, for double compartments, working in balance. A little ore has been hoisted and is in stock, and the production of 1904 will be large. This mine is subsidiary to the Buffalo & Susquehanna Iron Co.'s furnaces at Buffalo. It is a 25-cent lease with 100,000 tons annual minimum. It contains a large tonnage of good ore, about double what was measured up when the lease was made.

There are now but 850 men employed in mines in Iron county, Mich. (Crystal Falls, Iron River, etc.), compared with 1,600 last summer. About 50 of the 800 will lose their positions in a few days.

At Aragon mine, Iron Mountain, they are to carry out a large program of diamond drilling from underground. The fine new steel shafthouse at No. 5 shaft is in operation.

Menominee range mines as follows have ceased operations or curtailed the past week: Caspian and Verona, of Verona Mining Co.; Bristol, at Crystal Falls.

On the Gogebic range the Mikado Mining Co. has closed its mine for the rest of the winter. This takes about 150 men from the active list.

At Atlantic mine, near Hurley, they have recently made some encouraging discoveries and expect to follow them up at once, in the hope of making an important addition to the mine's tonnage.

Republic Iron & Steel Co. is hoisting about 750 tons a day from three Mesabi range mines it is now operating. Four are idle, including Union, which is 50 percent in ownership of the U. S. Steel, through American Steel Hoop. The company's Cambria, at Negaunee, is running very slowly but Lillie is doing better and will produce quite a tonnage this year.

M. L. Fay and associates have bought an interest in the Spelman-Daniels mine in section 6 T 58 R 15, east of Biwabik, Minn., where about 800,000 tons of high grade ore, much of it very hard, have been proved up.

Lincoln mine, at Virginia, Minn., is installing an electric tramming plant that will handle up to 2,000 tons a day. The mine will take on men in two months and will produce nearly much from these finds.

Reports are that large ore bodies are being cut in new work at Negaunee mine, belonging to the Cleveland-Cliffs Iron Co. and Lackawanna Steel Co. The management is hoping for much from those finds.

The Cleveland-Cliffs Iron Co. has commenced hoisting ore from its first Mesabi property, the Crosby mine at Nashwauk, in section 31 T 57 R 22. This mine has not shown up as expected when the lessees took possession, and their original plans for stripping have not been carried out. A contract for stripping was let during the summer but it was soon found that the ore was bunchy and lean, and could not be mined open pit. So a shaft has been sunk and the property will be worked in such a way as to save the grades of ore.

The International Harvester Co.'s Hawkins mine, section 32 T 57 R 22, is to resume operations in March with a full force. It will be pushed steadily the coming season. Their Agnew mine is now under extensive stripping development for milling.

Marvin VanBuskirk, who opened the deposits that have since become famous as the Fayal mine, the largest shipping property in the world, died last week at his home at Eveleth, Minn. He explored the Meadow mine, a small property east of Biwabik. He went to the Mesabi range in 1902 from Crystal Falls, Mich.

All Mesabi range mines of the U. S. Steel Corporation that have been operated under the management of the Minnesota Iron Co. will hereafter be managed by the Oliver Iron Mining Co., thus putting all Lake Superior mining for the corporation in properties controlled by it absolutely, under the same company.

The Great Northern Power Co., of Duluth, is asking waterwheel makers of this country and Switzerland for proposals on its first hydraulic machinery. This will include three 12,500-h. p. turbines, turbine exciters, governors, etc. The turbines are to run at 250 r. p. m., under a 365-foot head, on a vertical shaft. The electrical equipment will be ordered later. The first installation is to be 35,000 h. p., to be followed by additional equipment, as needed. The company contemplates early increase to 80,000 h. p. and all plans call for equipment and buildings that can be increased. The turbines are the largest units of power ever adopted. This is the company proposing to furnish electric power for the steam roads carrying ore from Minnesota mines to the head of Lake Superior. Just now, on account of the present policy of the U. S. Steel Corporation, nothing can be done in the change of equipment of these roads, but the company feels sure that the change will be made later. In the meantime it has sufficient business in sight to warrant its installation of the initial plant. The Great Northern Power Co., working in conjunction with leading electrical houses in the East, has evolved a plan for complete change in the haulage system of the ore carrying roads that promises to make an enormous yearly saving. In addition to the high pressure equipment for the generation of electricity for transmission, the company is to put in a 70-foot dam below its power house, where 14,000 h. p. will be generated for direct hydraulic use, to be taken by pulp and paper mills, etc.

The Montreal Iron Co. has closed its mine on the Wisconsin end of the Gogebic range, throwing out 125 men.

The Genoa Iron Co., Mesabi range, will take off the night shift and let out about 100 men. Explorations in the townsite of Sparta, in the immediate vicinity of this mine, have been under way for some time with one and two drills, and now a third is to be placed. The drills are working in the main street of Sparta, and close to the main business part of the village. It is reported that an excellent deposit of ore has been found there and that all now remaining to do is to prove the extent. This will mean the ultimate removal of the village, but this work will hardly be undertaken for some time.

Capt. H. Whitburn, who has been exploring what he thought was a "south range" formation of the Gogebic, several miles south of Bessemer, has stopped the work and has gone to Arizona, where he will be employed at a property in which G. W. Wallace and Capt. Harry Roberts, of Duluth, are largely interested and of which Wallace is to be general manager. This is largely owned in Minneapolis, and is said to give excellent indications. Whether Capt. Whitburn's south range explorations will be continued long is a matter of doubt, though the men interested are preparing to sink a number of pits. They think they have a promising exploration.

The Bristol, which has been employing about 100 men all winter, is cutting off half of them, and will run day shifts only.

A diamond drill has been at work in the bottom of the shaft of the Dunn mine, Menominee range, and the showing is said to be very encouraging. A downright hole was drilled and a depth of 50 feet of ore was found.

The fee owners of the Dober mine, Menominee range, are said to have received $12,000 from the Oliver Iron Mining Co. for the privilege of letting the property fill with water and remain idle for two years.

Recent exploring at the Michigan mine, Menominee range, is said to indicate excellent prospects for the company. The new deposit is on the foot wall side and is apparently making in a northwesterly direction. The width will average about 35 feet and the ore is of a high grade, some of it being within the Bessemer limit. It is a hard blue hematite.

The International Harvester Co. advises us that it expects to begin shipping ore from stock pile at the Illinois mine, near Baraboo, Wis., on or about March 1. It is probable that at the same time the company will start to unwater the mine and that mining operations will be resumed about March 15.

In our issue of Jan. 21 it was stated that a Worthington pump had been installed recently at the Agnew mine, Mesabi range. This was an error. A Prescott pump with a capacity of 1,200 gallons per minute is the only pump put in at this property.

INDUSTRIAL NEWS NOTES.

M. J. Carrigan, appointed receiver of the Pacific Steel Co., Irondale, Wash., to protect the interests of the creditors, stockholders and bondbuilders of the company, and to insure the carrying out of the plans made by the former president of the company, the late H. M. Swaney, who lost his life when the steamship Clallam was wrecked, has assumed his new duties. Mr. Swaney had negotiations with a New York firm looking to payment of the floating debts of the company and furnishing means to greatly extend the plant and put it in operation on a paying basis before another year. Receiver Carrigan said: "It is the hope of those interested in the Pacific Steel Co. to carry out completely the plans inaugurated by Mr. Swaney. The greater part of the work of building up this enterprise has been completed by Mr. Swaney, and had he lived a few months longer he would have seen his hopes materialize."

The recently incorporated Onondaga Forge Co., of Syracuse, N. Y., was started in June, 1903. The plant has a floor space 40 x 80 feet, equipped with steam hammers and other machinery for the purpose of catering to the trade in the line of general forgings, heavy and light. The Dunkhorst Brothers, who are the proprietors, have had 25 to 30 years' experience in this line. They have the reputation of turning out nothing but the best work.

The San Angelo Mfg. Co., San Angelo, Tex., recently incorporated, succeeds Findlater & Copeland, and will carry on the manufacture of hacks, buggies, etc.; will operate a machine shop and will add a well-equipped foundry in the future. The officers of the company are: J. Findlater Jr., president; J. R. Copeland, vice president; and Geo. Richardson, secretary.

The plant of the National Car Coupler Co., at Converse, Ind., has resumed operations after a long period of inactivity.

The furnace of the Iroquois Furnace Co., South Chicago, has been blown out for an indefinite period.

The New York Central railroad will soon let an order for 120 locomotives. The Schenectady works of the American Locomotive Co. are building five locomotives for the New York, Chicago & St. Louis railroad. The American Locomotive Co. is reported to have received contracts for three locomotives for use on the Hokkaido railroads in Japan.

The Fred. M. Prescott Steam Pump Co., Milwaukee, Wis., reports the following among recent shipments: A vertical steam condenser with a capacity of 70,000 pounds of steam per hour, to the Denver Tramway Power Co., Denver, Col., making three machines of this size to this company in 1903; a triple expansion mine pumping engine to the Republic Iron & Steel Co., with a capacity of 2,500 gallons per minute against 500 ft. head; a triple expansion mine pumping engine to the Clairton Steel Co., with a capacity of 2,500 gallons per minute against 500 ft. head; two large triple expansion pumping engines to the El Oro Railway & Mining Co., Ltd., El Oro, Mex.; a compound and condensing mine pumping engine to the Clover Leaf Gold Mining Co., Roubaix, S. D., with a capacity of 1,000 gallons per minute against 500 ft. head; two large compound boiler feed pumps to the Tennessee Coal, Iron & Railroad Co., Birmingham, Ala. Among recent orders the company has booked the following: From the Penn Iron Mining Co., Vulcan, Mich., three triple expansion mine pumping engines, each with a capacity of 1,200 gallons per minute against 500 ft. head; one triple expansion mine pumping engine with a capacity of 1,200 gallons per minute against 1,000 ft. head; four sinking pumps of large capacities; from the Cleveland-Cliffs Iron Co., two triple expansion mine pumping engines, each with a capacity of 1,200 gallons per minute against 500 ft. head; one triple expansion mine pumping engine, with a capacity of 1,000 gallons per minute against 500 ft. head; from the Calumet & Pittsburg Development Co., Bisbee, Ariz., one triple expansion deep mine pumping engine, with a capacity of 1,500 gallons per minute against 1,000 ft. head; one triple expansion deep mine pumping engine with a capacity of 1,000 gallons per minute against 1,000 ft. head.

The last of the machinery of the Marinette Iron Works, Marinette, Wis., was shipped to Chicago Heights last week. The office force will move to Chicago Heights about Feb. 1.

Col. James S. Graham has retired from the J. S. Graham Machine Co., Rochester, N. Y, having disposed of his interest in the company to the A. T. Hagen Co. Col. Graham had been with the company that bore his name for 36 years. For eleven years the Graham company has manufactured laundry machinery for the Hagen concern. For the past seven years his son, William J. Graham, has also been connected with the company, and will now retire with his father. The Hagen Co. is arranging to increase its capital stock, and heads of departments will be allowed to obtain an interest in the stock.

The Keystone blast furnace of the Reading Iron Co., Reading, Pa., which has been out for repairs, will be put in blast some time in March.

The shops of the Rock Island railroad at Trenton, Mo., Davenport, Ia., and Peoria, Ill., will be closed Feb. 1, and the employes to the number of about 900 will be employed in the new shops at Moline, Ill. It is expected that 1,000 men will be employed at the new shops during February and that 2,000 will be employed by next October.

The Pease Locomotive Works and the Hegewisch Car Shops have reopened with 3,000 employes after a shutdown of a number of weeks.

Both the wire and rod mills of the Colorado Fuel & Iron Co., Pueblo, are now in operation. Six blast furnaces are ready for resumption, and it is stated that will be started in a week or ten days. It is also announced that work in the machine shop, foundry and other branches will start at an early date.

TRADE PUBLICATIONS.

The interlocking shoulder bearing chain belt manufactured by the C. O. Bartlett & Snow Co., of Cleveland, receives exclusive attention in catalogue No. 6. This chain is adapted for heavy work, rolling mills, mines and conveying and elevating machinery.

A catalogue from the Societe Anonyme des Moteurs a Gaz, A Bollinck of Buysinghen, Belgium, asserts at the start that the only object is to show the superiority of the product of the firm. The makers have profited by the wide experience attained as engine builders, and all parts are made on the interchangeable system. The quality of the metals is the constant care of a chemist and the manufacturer asserts frankly in his native language that the system is based on the most recent American methods. Gas making machines are also included in the freely illustrated apparatus.

A card contains a concise description of the new 42-inch boring and turning mill made by the Bullard Machine Tool Co., of Bridgeport, Conn. The card is of noticeable character and the surprising means taken to ensure this result is at least worth an inquiry for a sample.

The Charles G. Stevens Co., of Chicago, in catalogue No. 1 has a neatly printed list of hot and coiled rolled steel and iron products.

Carey's coverings is the burden of the latest publication from the Philip Carey Mfg. Co., of Lockland, O. The firm manufactures carbonate of magnesia, asbestos sectional steam pipe and boiler covering, magnesia flexible cement roofing, asbestos materials and roofing paints.

The Norwalk Mfg. Co., of Norwalk, O., announces in a recent catalogue its succession to the Baker & Wilson Machine Co., of Cleveland, and the Norwalk Foundry & Machine Co., of Norwalk, O. The company makes bolt cutters and nut tappers.

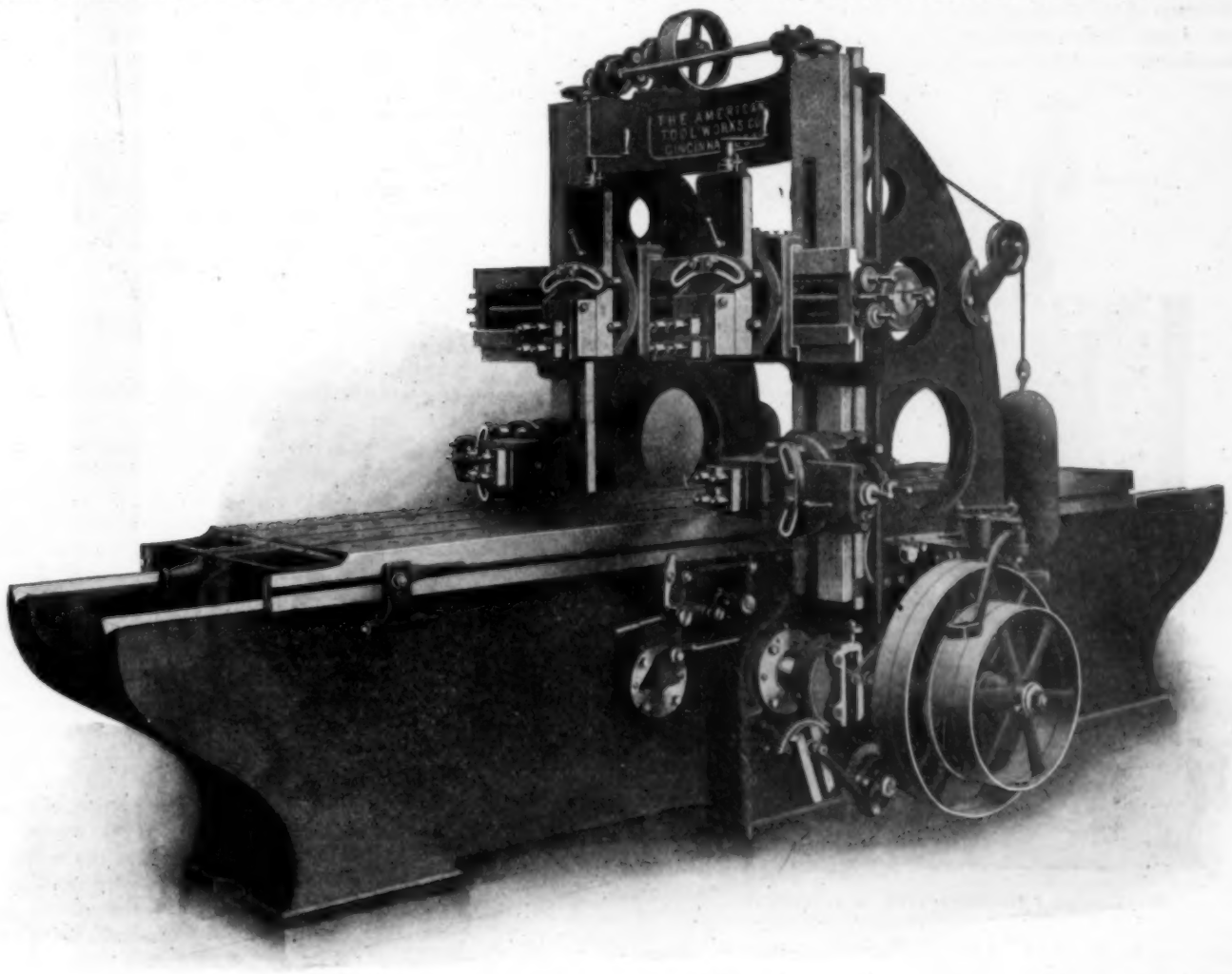
Steam specialties comprising safety water columns, steam traps, scale separators, air traps, exhaust heads, etc., of the kind made by the Wright Mfg. Co., of Detroit, Mich., have their merits and construction outlined in a new catalogue. Many sizes are listed and there are a number of flattering testimonials from users.

An attractively printed booklet is the second in a series of tests of plants in service and is devoted to the output of the Buffalo Forge Co., of Buffalo, N. Y. The data have been prepared by Professor Carpenter and Diedericks, of Cornell University, and relate to the performance of a 12 and 18 x 10-inch, horizontal tandem compound high speed engine.

A binding cover to contain the bulletins of the D'Olier Engineering Co., of Philadelphia, affords a convenient means of controlling the loose leaflets and circulars occasionally sent out by the firm.

NEW STANDARD METAL PLANER.

The standard metal planer recently designed by the American Tool Works Co., of Cincinnati, contains a number of radical departures from former patterns, in order to meet successfully the greatly increased strains imposed upon planers by modern methods in shop practice. The bed is exceptionally deep, extending almost to the floor line, with short substantial legs, cast integral with the bed. Heavy box cross girts at short distances give the bed a great rigidity. The bed is very long in proportion to table when planing at full length. The central portion where the strain is heaviest, is strongly reinforced. The table is of ample proportions, well braced by ribs to obtain great strength without unnecessary weight, has improved dirt-proof conveniences and quick return motion reversing without shock or jar. An improved type of shifting mechanism removes the belt from one pulley before the return movement belt engages the other, thus obviating all disagreeable shrieking of belts. A safety locking device prevents the table from starting before the operator is ready. The



A NEW PATTERN 36-INCH PLANER.

heads are firmly secured to saddles on cross rail by four bolts instead of two, as on many planers. Feeds are automatic in all directions and can be operated from either side of the machine. Side heads can be furnished as in the illustration, at any time after the machine is built, with slight modifications. Slides are so constructed as to permit of planing at some distance from the housing. Rail heads and side heads have separate feed mechanisms which operate entirely independently in all directions, and at either end of the stroke. The action of this planer is remarkable for smoothness. In planing work which is afterwards to be scraped to a surface, the accuracy and evenness of the cut are such as to reduce the necessary scraping to a minimum.

United States Consul S. E. Magill, writing from Tampico, Mex., says that but little coke came from Europe between July and the end of November and that was to fill contracts made last year. Coke was was purchased from Germany and England by the smelter and steel company at Monterey. He states that the smelters will not use the European coke if American can be had at right prices, as the American is preferred; but the steel works like the German coke, and may use some of it in the future. The price of the first coke bought in Germany was $6.48 per long ton f. o. b. Tampico; afterwards it was bought for less, but the consul could not learn how much. The freight rates averaged about $2.88 per ton from Amsterdam, Rotterdam, or Antwerp.

Copper production of Calumet and Arizona copper mine, which is owned largely by Lake Superior iron men, was as follows for the year 1903: January, 1,600,000 pounds; February, 1,500,000; March, 1,307,000; April, 1,800,000; May, 2,130,000; June, 2,178,000; July, 2,170,000; August, 2,698,000; September, 2,536,000; October, 2,536,000; November, 2,644,000; December, 2,878,000; total 25,979,000. This is blister copper, 99 percent fine, making the amount of refined copper made during the year, 25,719,000 pounds. This compares with 2,067,000 pounds made the preceding year, from Nov. 15 to Dec. 31. It is expected that the mine will produce at least 32,000,000 pounds the present year. The entire production now is from one shaft and by two 300-ton smelters, while a second shaft is rapidly approaching completion and two more smelters will be ready to treat its product. The record is phenomenal, and was never approached by any new copper mine in the world.

The Warren Independent Steel Co. is to be the name of the new corporation of $20,000 capital, which is being organized in Warren, Ill., to manufacture steel siding, ceiling, roofing, cornice, imitation stone, brick, etc. A temporary organization is as follows: L. C. Russell, president; Chas. Phillips, vice president; J. L. Graham, secretary; R. C. Cullen, treasurer; C. F. Taylor, M. Pepoon, L. H. Buser and Michael Morris, building committee.

The Use of Superheated Steam.*

BY PROF. STORM BULL.

Anybody who has followed the development of the steam engine during the last few years, cannot help having noticed the increased use of superheated steam, especially in European practice. All new steam plants of any considerable size, and even many smaller ones, on the continent of Europe are now using superheated steam; and in the last couple of years a number of plants utilizing superheated steam have been built in this country. It cannot be doubted, however, that the United States has been behind Europe in this respect and that it is high time that we try our very best to at least equal our competitors in this branch of mechanical engineering. Because of the comparative newness of the subject it is very possible that a great many American engineers do not realize its importance and it is, to a certain extent at least, the purpose of this paper to try to convince the skeptical ones that it is necessary to use superheated steam in order to attain the highest commercial efficiency of the steam plant—not of the steam engine alone—but of both engine and boiler combined. To avoid misunderstanding it is perhaps necessary to state at this place that this

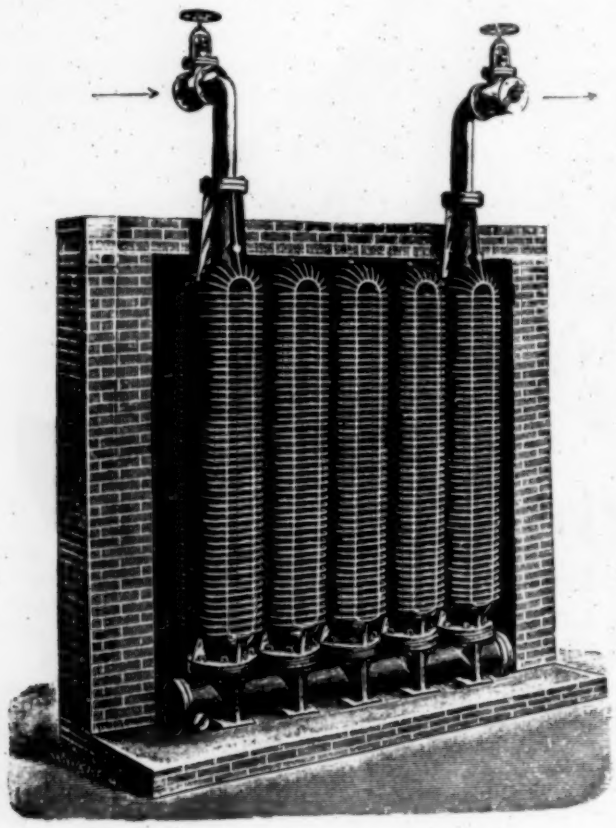


FIG. 1.—THE SCHWOERER TYPE OF SUPERHEATER.

does not apply alone to the ordinary reciprocating steam engine, but also to at least the same degree to the steam turbine.

The use of superheated steam is not new; on the contrary, it is probably not far from 75 years old. The old masters in steam engineering, without doubt, realized the fact that the principal loss of efficiency in the steam engine was due to the condensation of steam in the cylinders, and, as is well known, they tried a great many means to reduce it and with varying degrees of success. There is no question in the minds of all competent authorities that the best means of reducing the condensation is in the use of highly superheated steam, and this has been known for a great many years. It almost seems that the "grand old man" James Watt anticipated or at least had a presentiment of nearly all the improvements in the steam engine which were to be introduced into its design during the last century. However, it seems that he had no knowledge of superheated steam or of its advantages, which seems very natural, as he really was the first one who had an adequate and thorough knowledge of saturated steam. The first mention of the practical use of superheated steam, which I have been able to discover, is found in the "Life of Richard Trevethick" of the Binner-Downs Mine in Cornwall, England. In this book it is stated that a certain Captain McGregor in 1828, in order to compete with a record established by an engine of a neighboring mine, whose cylinders had been insulated with sawdust, built a jacket of brick around the cylinder and the steam pipe, with an air space between the brick work and the iron and that he built a fire in this open space, by which means he increased the duty of his engine from 41,000,000 to 63,000,000 foot-pounds per bushel (86 pounds) of coal. Trevethick himself tested the 70-inch cylinder engine with steam at 48 pounds pressure and which made 8 strokes per minute, and he found that by using 5 bushels of coal in 24 hours under the cylinder, he reduced the consumption of coal by the boiler from 108 to 67 bushels for the same work, showing a saving of more than 26 percent. That such a saving must necessarily have aroused attention is evident; but it has been impossible for me to find any trace of it in the published records. In 1834 John Ericsson made some experiments with superheated steam, but no record of these experiments has been found. The next record that I have been able to find is that in 1845 Mr. Longridge made several experiments with superheated steam at low pressure, and in 1851, he was followed by Rafford in France who took out patents for a superheating plant.

From this time on, and lasting, perhaps, for 20 years, the interest in superheated steam was very active. Among the many engineers and scientists who contributed to the progress in this line should be mentioned especially Hirn, Isherwood and Faraday. The first named made a great many experiments in 1857, using steam of 55 pressure and temperatures ranging from 410 to 490 degrees Fahrenheit. The results of his accurate experiments showed an increase in the economy of the whole plant of from 20 to 27 percent.

During the fifties and sixties, however, the principal use of superheated steam was found in the marine engine, and in the literature of the subject quite a number of tests of steamships with and without the use of superheated steam may be found. Penn showed an increase of economy of 20 percent for the steamer Valletta with a steam pressure of 20 pounds. The Parson and Pilgrim's superheater was especially designed for marine practice. It consisted of a number of semi-circular pipes placed in the furnace, by which means it is stated that a saving of one-third in fuel was realized. The English Board of Trade, however, objected to the use of superheated steam on the ground that the high temperatures used were liable to break the steam up into elements, thereby making it unnecessarily dangerous. Fortunately, Professor Faraday, who fully investigated the matter, was able to convince the authorities that this object was unfounded. The tests of marine engines made at about the same time, during the latter part of the fifties, show gains in economy of from 20 to 30 percent, always depending upon the amount of superheat which was available.

Our own Isherwood was at first very skeptical as to the practical use of superheated steam. He at first declared against it on the ground of injury to the cylinder, difficulty of lubrication, extra weight and short life on board of ship. Later on, however, he recommends the use of superheated steam because of the gain in economy of 30 percent shown by his experiments, but suggests that the limit of superheat be placed at 100 degrees Fahrenheit, on account of the difficulties of lubrication. In 1863-1864, he made extensive tests on the steamer Eutaw, which has a single cylinder inclined engine with poppet valves and a Stevens adjustable cut-off. The best results of these tests show a gain in steam economy of 18 percent and 15 percent in coal consumption.

During the years from 1850 to 1870 a great many superheaters were installed, especially on shipboard, notwithstanding the fact that engineers always found great difficulties with respect to the lubrication and that the material of the superheaters did not withstand the action of the heat for a very long time. That there was trouble with the lubrication should not surprise anyone when it is remembered that none of our present day mineral oils were known at the time, and that the only available lubricating materials were animal oils and fats. The steam pressure used up to that time did not exceed 50 pounds, at least not on ship-board, and for such a pressure the animal oils or tallow answered very well, even if the steam

*Read before the Western Society of Engineers.

was superheated perhaps 100 degrees Fahrenheit. But the latter part of the sixties saw the introduction of the compound engine with its accompanying higher pressure, and this proved to be a very effective damper to the use of superheated steam —and for two reasons. The first one was the very much greater economy of the compound engine as compared with the single expansion engine using steam of lower pressure, and because of this increased economy a saving of both space and weight, a very important factor in a ship. The second reason was that the difficulties in the way of proper lubrication of the cylinders became so great that it was found necessary to reduce the superheat to such an extent that the gain from it in economy became almost imaginary and which certainly did not warrant the expense of the installation of the superheater. The universal use of the compound engine on shipboard, therefore, very soon made the use of superheated steam impossible on steamships. It had been much less used in stationary practice, but with the gradually increasing pressure it also disappeared here. It is true enough that the use of mineral oils very soon after this time became general, but our present day heavy lubricating cylinder oils were not known then, and, in addition, and this is much more important, the attention of all the foremost engineers of the world, working in this line, were now exclusively directed towards the improvement of the economy of the steam engine by means of the use of higher pressure and of the compound principle; they lost sight of the superheated steam, presumably, because

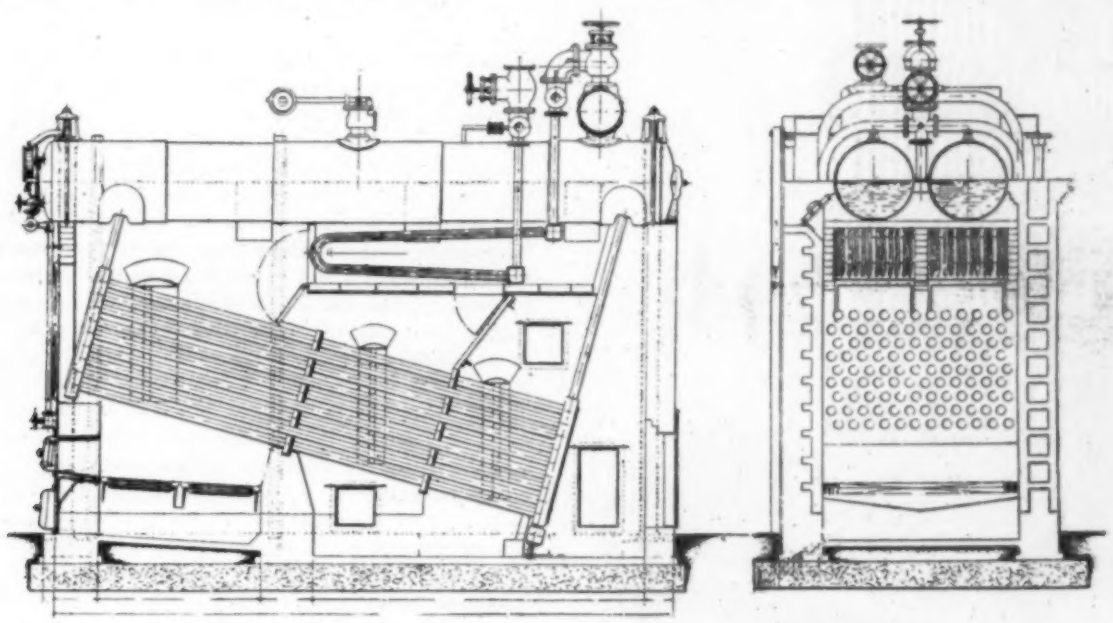


FIG. 2.—BABCOCK & WILCOX WATER TUBE BOILER WITH WROUGHT IRON SUPERHEATER IN THE BOILER SETTING.

of the many bad reports regarding its use. The improvement of the economy of the steam engine during the last thirty years of the last century was all due to the increasingly higher steam pressure and to the introduction of the compound and multiple expansion engines, if exception be made concerning the greatly improved mechanical details, especially with respect to valve gear and governor. But towards the end of the last century nearly all competent engineers agreed that the improvement due to the causes just mentioned had about reached its limit. The increased cost of making more than a triple or quadruple engine was not warranted by the very slight increase in economy due to an additional cylinder—at least with the high steam pressure then practicable. Because of the available material it had been impracticable—perhaps unprofitable—to design boilers for a higher pressure than, say, 250 pounds. It is due to this fact that the attention of the engineering world has within the last half dozen years increasingly been directed to the use of superheated steam as a means of improving the still lamentable low economy of the steam engine, and it is my opinion that the history of these years has conclusively shown that for the present, at least, the outlook in this direction is very much brighter than in any other. I realize very fully that Professor Lewicky, of the Polytechnic School of Dresden, Saxony, is perfectly correct when he states that all that is necessary in order to get a theoretical efficiency of the steam engine of 80 percent is for the practical engineers of the world to supply material from which cylinders and boilers could be made which could properly resist pressures corresponding to a temperature of something like 1800 degrees Fahrenheit and also such temperatures. Unfortunately, there is at present no prospect that such a material will be supplied, at least in the near future, and, in fact, as stated above, the limit as to pressure has just about been reached for the present, and it is but natural that engineers should be looking out for other means of improving the economy of the steam engine which is still our greatest source of motive power. During all the years when it seemed that all interest in superheated steam had died out, there were still a few firm adherents working in this line. Among them must be specially mentioned Hirn, in Mulhouse, Alsace, his successor Schwoerer, and William Schmidt, in Germany. More than to any other it is due to these persons that at the present time superheaters have become a practical success. Schwoerer originated the ribbed cast iron superheater used extensively at the present time, whereas Schmidt used wrought iron coils and he was the first to use in practice highly superheated steam, the superheat often being more than 200 degrees Fahrenheit. Some of you will no doubt remember the sensation that was created when some eight years ago the results of a series of tests of a boiler and engine built especially for superheated steam by William Schmidt were reported in the technical papers. The tests had been conducted by Professor Schroeter of Munich, probably the highest authority in this branch in Germany, so that the results could not be doubted. Although the engine was quite a small one, yet it was shown that the consumption of steam had been only about 10.4 pounds per indicated horsepower per hour, when using superheated steam; whereas the consumption of steam per brake horsepower hour was only about 12.3 pounds, the engine developing 75 h. p. The statement of the consumption by an engine of a certain number of pounds of superheated steam per horsepower per hour does not give the means for a true comparison of the performance of this engine with one using saturated steam. It is much more equitable to base the comparison on the consumption of coal or the number of heat units converted into work. In the test spoken of it was shown that the amount of coal used per indicated horsepower per hour was only about 1.3 pounds, certainly an extraordinary result for an engine of only 75 h. p. The engine in question was a tandem compound, both cylinders being single acting; throughout of very original design and built especially for the use of highly superheated steam. The boiler which was also built and designed by Mr. Schmidt, was also very original and has since proved to be excellent in every way. As a result of this first test, Mr. Schmidt's engines became very popular and at the present time several hundred are running in Germany and adjacent countries.

As is well known there are two essentially different arrangements of the superheater with respect to the boiler. The most common is to install a coil in the boiler setting proper, through which the saturated steam taken from the top of the boiler is drawn on its way to the steam engine. If a high degree of superheat is wanted the coils must be installed in such a way that the hot gases will strike them long before they have been cooled sufficiently to allow them to escape into the chimney. This arrangement has, as is well known, been extensively employed by the Babcock & Wilcox Co. On the other hand, if only a slight superheat is desired the coils may be placed so that the gases on their way from the boiler to the chimney will surround the coils. It may, however, be stated at this place that this last arrangement is usually not satisfactory, as the degree of superheat is so small that the gain in economy of the steam engine frequently does not warrant the installation of the superheater.

The second arrangement is to install an independent superheater with separate furnace, and a great many installations of this kind are found at present, especially on the continent of Europe. Many competent engineers have expressed their doubts as to the possibility of a gain in economy due to such

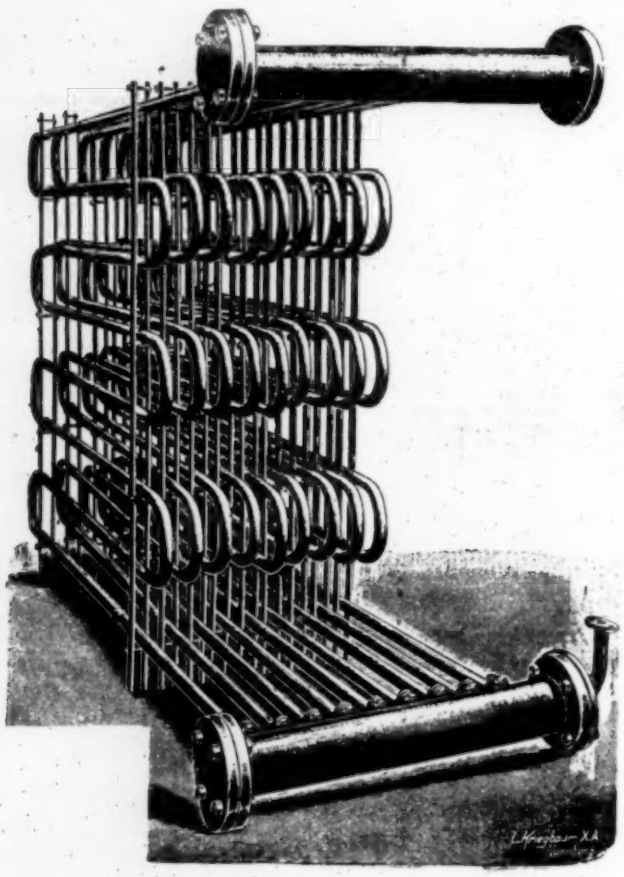


FIG. 3.—SUPERHEATER MADE BY A. HERING OF WROUGHT IRON PIPE INSTEAD OF ELBOWS.

installations, but repeated tests of a number of such plants have conclusively shown that these doubts were not warranted by the facts. When properly designed and run, such installations have invariably shown an economy as compared with the ordinary boiler and engine arranged for saturated steam.

Both wrought iron or steel, and cast iron are at the present time being used for superheaters. Because of the high temperature to which the material of the superheater will be raised, it is impracticable to have ordinary flange joints or couplings exposed to the hot gases. If therefore the superheater consists of a series of steel pipes of small diameter, they must be bent into coils, something like the ammonia pipes in a refrigerating machine. If on the other hand, the superheater is built of cast iron it is usually built along the lines in which Schwoerer originally made them; a number of large, straight cast iron pipes connected by flanged return bends, the flanges being placed in such a manner that they cannot be reached by the hot gases, these pipes being also provided with a large number of external ribs so as to increase the heating surface. It is probable that the latter type will suffer less than the former type because of the action of the heat, both because its material is cast iron and because the walls of the pipes are quite heavy; but on the other hand, the heating surface in the former type will be much more effective—both because of the fact that the walls of the pipes are so thin and because the steam to be superheated is here distributed in a large number of small pipes, so that all steam is much closer to the hot gases from which the superheat is to be derived. The difficulties which were encountered years ago with respect to the wearing out of the superheaters have now been overcome, as can be readily seen from the fact that there are now in service superheaters which have been used continuously for eight years and without any important repairs. The number of plants now running in continental Europe is several thousand, of which several hundred are more than four years old, and any one familiar with the periodical literature, of Germany in particular, will agree with me that the published records of these plants so far as they can be found all testify to the fact above stated that the criticism, so often heard in former years that superheaters deteriorated very rapidly, is not true at the present time.

It was also to be expected that the use of such high temperatures in the engine cylinder would create new difficulties, not alone with reference to the proper lubrication of the same, but also and perhaps still more so, with regard to the great expansion of the parts of the cylinder itself. But it can also be stated positively that all these difficulties have been overcome. Just as in the gas engine where the temperatures are very much higher, and where these difficulties have been overcome by the proper design of the cylinder, so in the steam engine our modern engineers have found the proper way to proportion the various parts of the cylinder in such a manner that the expansion due to the high temperature does neither produce breaks in the casting nor leaks at the stuffingbox. With reference to the lubrication it is only necessary to remind you of the existence of our modern heavy lubricating oils which made our modern gas engines possible. However, these difficulties also explain the fact that William Schmidt previously mentioned, and who is more than anybody else entitled to the credit of the progress in the use of superheated steam during these late years, designed his first engines for superheated steam as single acting, probably in imitation of the only successful gas engine then existing, in which both the proper lubrication of the cylinder and the taking care of the expansion of the same had been satisfactorily accomplished. But at the present time, eight years since Schmidt first achieved success, we have both double acting gas engines and steam engines using highly superheated steam, and when properly designed and looked after, they run satisfactorily. What is more, in my mind at least, both the double acting gas engine and especially the double acting engine for superheated steam, will be the type of the future, if recent progress in these lines is to be any criterion for what is going to follow. The latest steam engine designed for superheated steam does not look very different to the uninformed from an engine using saturated steam of very high pressure, although a good many details may be different. In this connection it might be mentioned that the conclusive evidence of the experience of recent years is that Corliss valves are not adapted for the use of highly superheated steam and that consequently we in our country will have to modify the design of our most economical engines in a very essential part before we can use with profit steam superheated to a degree which will show an improvement in economy to such a degree that it will warrant its use. As was intimated before, it is not alone the reciprocating steam engine proper which benefits, from the introduction of superheated steam. The steam turbine, so far as the experience goes at present, is destined, it seems, to improve its economy to a higher degree even than the reciprocating engine. Experiments seems to show it, and the reasons for it advanced by the various investigators seem perfectly plausible. It would, however, carry me too far to enter upon this question, and I would rather reserve this matter for a future day when I hope I shall be able to take up the steam turbine for discussion, the importance of the subject certainly warranting such separate treatment.

I am fully aware that so far my statements have been of a

very general nature, and that I have given hardly any proofs for my absolute belief in the future of the use of superheated steam. Because of experiments conducted under my direction and because of the published results of thoroughly reliable tests I have become fully convinced, but in order to have any influence upon my auditors I shall need to quote some of the results upon which I have placed my faith. In what follows, therefore, I propose to present to you some of the principal tests of engines using superheated steam and conducted by

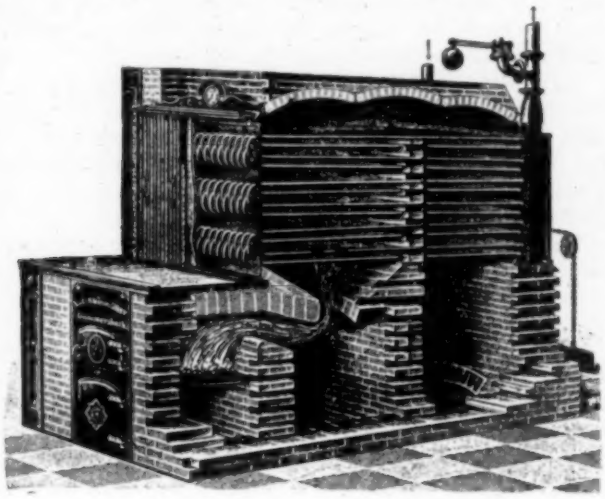


FIG. 4.—STEINMÜLLER SUPERHEATER INDEPENDENTLY FIRED.

competent authorities, as well as the results of my limited experience in this direction.

The principal results of the test of Professor Schroeter of the Schmidt engine and boiler in 1895 and mentioned before, were as follows:

Size of Engine—12¼ in. x 27 3-16 in. x 19¼ in.: vertical, tandem, compound, making—

	1st Test.	2nd Test.
Pressure	156.2	159.0
Brake Horse Power	61.72	62.18
Superheat, Degrees Fahrenheit	235.0	281.0
Steam in Lbs., per I. H. P., per hour	10.91	10.19
Steam in Lbs., per Brake H. P., per hour	12.61	12.34
Coal in Lbs., per I. H. P., per hour	1.36	1.26
Coal in Lbs., per Brake H. P., per hour	1.57	1.52
Per Cent of Heat Accounted for in Saturated Steam	65.0	63.7
Per Cent of Heat in the Superheat	6.9	8.2
Per Cent of Heat given to Feed Water	6.9	6.6
	78.38	78.5

Schroeter also reports on a similar engine, a little larger however, of 90 h. p., using superheated steam, which engine used only 9.95 pounds of steam per horsepower per hour and 1.43 pounds of coal, certainly a very remarkable result for such a small engine.

In 1896 Professor Ripper, of England, published the result of a series of tests of a small Schmidt engine using superheated steam. The size of the engine was 7 1-16 x 11¾; it made 180 r. p. m. He used both saturated steam and steam of different degrees of superheat in order to show the influence of the same.

	1	2	3	4	5	6
Steam Pressure, Lbs., Absolute,	87.5	79.9	86.1	87.6	118.4	116.0
Temperature of Steam, deg. F.	329.0	412.0	500.0	667.0	612.0	653.0
Degrees of Superheat, F.	0.0	88.0	261.0	338.0	283.0	306.0
Indicated Horse Power	16.55	16.32	16.43	16.59	17.73	17.60
Lbs. of Steam per hour per indicated Horse Power	39.33	34.66	21.48	19.13	18.84	17.58

It will be apparent from this table how rapidly the consumption of steam decreases with the increase of the superheat. With 338 degrees of superheat the number of pounds of steam used is not quite one-half of that used for saturated steam. In itself this performance of a single expansion, noncondensing engine, indicating only some 18 h. p. and using less than 20 pounds of steam per horsepower per hour is very startling.

In 1895 a large, triple expansion engine for superheated steam was installed in Augsburg, Bavaria. The old boilers were to be used and these could not carry more than 85 pounds pressure; but in connection with these Schwoerer superheaters were installed. Professor Schroeter conducted some very exhaustive tests on this plant, using both superheated and saturated steam in order to find out whether the moderately superheated steam showed any gain.

The dimensions of the engine were as follows:

Diameter of high pressure cylinder, 27½ inches.
Diameter of intermediate cylinder, 43⅜ inches.
Diameter of each of the two low pressure cylinders, 45⅜ inches.
Stroke of all pistons, 63 inches.
The engine made 60 revolutions per minute.

The main results of the tests are as follows:

	1	2	3	4	5	6
Indicated Horse Power	1180.5	1167.3	1127.8	1200.8	976.9	993.1
Steam Pressure (Gauge)	84.34	83.35	84.21	84.77	83.35	83.92
Temperature, Deg. F.	414.7	418.1	420.1	327.1	326.1	326.5
Degree of Superheat	87.9	92.0	92.3	.....	.....	.....
Steam per Horse Power, Indicated, per Hour	13.06	12.68	12.05	14.31	13.55	13.22

Although the degree of superheat here is very moderate and the steam pressure very low, yet a decided gain in economy is shown.

A small Schmidt steam engine and boiler installed at Ascherleben, Germany, was also tested by Professor Schroeter. The cylinder had a diameter of 9⅞ inches and a stroke of 15¾ inches and was single acting; it made 150 r. p. m. A series of tests were made to show the influence of the cut-off and of various degrees of superheat. The most important results were as follows:

	1	2	3	4	5	6
C.O. Per C., 1	16.1	22.9	35.0	41.1	48.0	22.5
St. Pr. 2	120.0	115.7	111.4	98.7	96.8	113.6
T. Deg. F. 3	669.0	671.0	673.0	680.0	689.0	667.0
S'ht, Deg. F. 4	319.0	324.0	328.0	343.0	354.0	321.0
Con. St. 5	17.85	17.59	18.03	17.54	18.03	17.45
		7	8	9	10	11
C.O. Per C., 1		15.7	23.4	36.5	26.1	24.3
St. Pr. 2		115.6	115.0	105.1	90.9	98.7
T. Deg. F. 3		574.0	588.0	597.0	491.0	408.0
S'ht, Deg. F. 4		227.0	241.0	206.0	100.0	71.0
Con. St. 5		18.86	18.52	18.93	23.08	27.68

1. Cut-off, per cent.
2. Steam Pressure, by Gauge.
3. Temperature, Degrees Fahrenheit.
4. Superheat, Degrees Fahrenheit.
5. Consumption of Steam per Horse Power per Hour.

The results conclusively show that the cut-off has very much less influence on the economy of the steam engine when running with superheated steam than with saturated, because there is very little change in economy between a cut-off of 16 percent and one of 48 percent, whereas it is probable that if the engine had been running with saturated steam this difference would probably have been at least 25 percent. It is also well known that the interchange of heat between the steam and the cylinder walls is very rapidly reduced with increased superheat, so that, for instance, the heat absorbed by the walls during the admission period is almost zero when the steam is superheated from three to four hundred degrees. From some tests to be quoted later this will be very plain. But

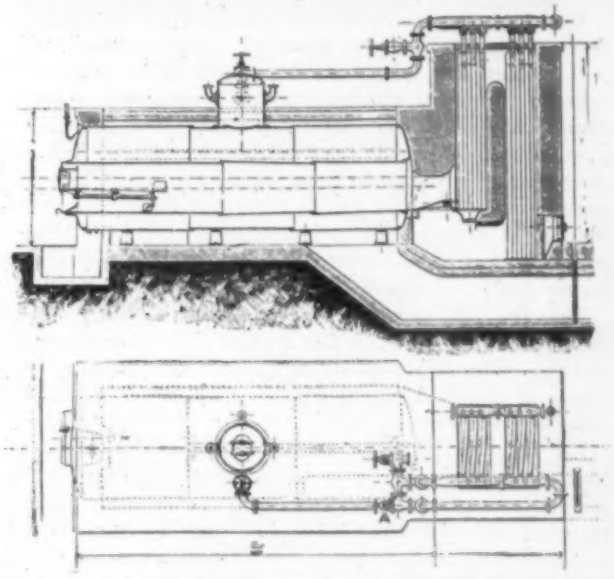


FIG. 5.—THE DINGLER MACHINE CO. SUPERHEATER OF WROUGHT IRON PIPE, PLACED IN THE BOILER SETTING.

in passing it is perhaps worth while to call attention to the fact that the gain in economy due to the use of superheated steam is not alone due to the greatly reduced condensation in the cylinder, a fact which everybody recognizes, but also and perhaps in just as high a degree, to the greatly reduced interchange of heat between the walls of the cylinder and the steam while it is in the superheated state, this being due to the absence of water, which is always adhering to the walls when saturated steam is being used. From a number of carefully conducted tests it has been shown that the steam at the end of the expansion in the high pressure cylinder of a compound engine is still slightly superheated, if the superheat to begin with is from 200 to 300 degrees Fahrenheit. This is especially true if the cylinder is jacketed with superheated steam, and under such circumstances it would almost seem that it should be possible to eliminate all condensation from the high pressure cylinder, and at least reduce the heat interchange to such an extent that it hardly needs to be considered. In a single expansion cylinder or engine this would not be true, at least with the degree of superheat which is being used at present, as necessarily the change in temperature of the steam here would be very much greater. To prove these statements I submit the results of two sets of tests made by Professor R. Doerfel; one for a compound and one for a triple expansion engine.

Compound engine at Haunsdorf, Germany.

	1st Test.	2d Test.
Indicated Horse Power	297.1	326.1
Steam Pressure, in Pounds	99.4	101.8
Temperature of Steam, Degrees Fahrenheit	337 1	495.0
Superheat, Degrees Fahrenheit	0.0	156.0
Pounds of Steam per I. H. P., per Hour	14.1	11.9
Heat Units per I. H. P., per Hour	286.0	257.0
Percentage of Heat Units contained in Steam given to Walls of High Pressure Cylinder during Admission Period	11.84	3.37
Percentage of Heat Units contained in Steam given to Walls of Low Pressure Cylinder during Admission Period	27.3	21.6

Triple expansion engine at Zwoden, Bohemia.

	1st Test.	2d Test.	3d Test.	4th Test.
Indicated Horse Power	801.8	793.9	654.0	612.5
Steam Gauge Pressure, in Pounds	Average, 138.5			
Temperature of Steam, Deg. Fahrenheit	495.5	496.0	512.8	499.5
Superheat, Degrees Fahrenheit	135.9	137.0	153.2	140.1
Pounds of Steam per I. H. P., per Hour	11.07	10.95	10.75	10.95
B. T. U. per I. H. P. per Hour (deg.)	237.8	235.5	232.8	236.1
Percentage of Heat contained in Steam given to Walls of High Pressure Cylinder during Admission Period	2.67	1.75	3.3	4.73

In the case of the compound engine, the direct comparison between superheated and saturated steam is made, and as will be seen the amount of heat given to the walls of the cylinder during the admission period is reduced to about one-fourth of what it is for saturated steam. For the triple expansion engine, it will be seen that the loss of heat is so small that it hardly needs to be taken into account in practical engineering. It should also be remembered that in both cases the degree of superheat is comparatively low, and that still better results can be expected and are in fact realized with a higher degree of superheat.

That the consumption of steam in both cases is very low should also be noticed, in fact a great deal lower than can be realized when saturated steam is used, but obviously if the degree of superheat had been greater, still better results would have been obtained.

Fig. 1 shows the superheater built by Boehmer Bros., Magdeburg, Germany. It is of the Schwoerer type; is made of cast iron, and in each pipe there is a partition extending from the bottom to near the top, so that the steam is forced to pass up the pipe on one side of this wall and down on the other. Each pipe has only one flange connection, so that they are free to expand upward. This superheater may be attached to almost any kind of a boiler, or it may be fired independently.

Fig. 2 shows the superheater built by the Babcock & Wilcox Co., also of the wrought iron type. It will be seen how, by means of two dampers, the hot gases may be prevented from reaching the superheater tubes. The amount of superheating surface in this arrangement is only sufficient to give a superheat of about 150 degrees Fahrenheit, when the boiler is working under ordinary conditions.

Fig. 3 shows one of the superheaters built by A. Hering, in Nürnberg. The material is wrought iron, and, as will be seen, all flange connections may be placed out of reach of the fire. This superheater has also been used in connection with a number of kinds of boilers—for instance, with water tube boilers, in which case it is placed above the drum.

Fig. 4 shows the Steinmüller superheater as arranged for independent firing. It is also made of wrought iron and has especially been used in connection with water tube boilers, and several hundred of this type have already been built.

Fig. 5 shows the superheater built by the Dingler Machine Co., Zweibrücken, Germany. It is also made of wrought iron. In the figure it is plainly seen how, by means of the valve "A," the steam may be passed through the superheater or not, and also how the hot gases from the furnace may be prevented from reaching the superheater, by raising the damper at the rear of the furnace flue. As will be seen, the superheater is here divided into two parts for the purpose of utilizing the heat of the furnace gases to better advantage.

In studying the files of the technical periodical literature of continental Europe for the last few years, one finds the records of a very large number of tests of plants using superheated steam, and all the records so far as I have seen them, point in the same direction. Out of these I have almost at random picked out a few and after having transformed the results into English units, have given the main results. It would hardly seem that it was necessary to give any more, especially as these numbers must seem rather dry to the audience. But only a month or two ago appeared a series of articles in the *Zeitschrift des Vereins Deutscher Ingenieure* by Professor Schroeter, in which he gives the results of some remarkably interesting tests of a 250-h. p., compound steam engine, built and installed in Ghent, Belgium. The tests were made for the purpose of determining the gain in economy due to the superheating of steam to various degrees and also to determine the influence of the variation in the load on the economy, using superheated steam. A series of sixteen tests were made with the utmost care and the results have been worked up in such a painstaking and complete manner that I have never seen its equal. As the results obtained from this engine are truly remarkable, in fact are so good that Professor Schroeter says in the first article that the economy shown is higher than for any other engine of its size so far tested, I have thought that it might be interesting to give the main results here. A series of six tests with saturated steam and for the same loads, with the exception of one, in which the engine was empty, and finally, five tests were made for the same load but with different degrees of superheat.

The engine was a tandem compound, having poppet valves and run-condensing. The cylinders were 12¾ inches and 22 inches in diameter, the stroke being 32½ inches, and it made 127 revolutions per minute. The steam pressure was kept as nearly as possible equal to 145 pounds by the gauge during all the tests. The main results follow:

Number of Test.	1	2	3	4	5	6 (empty)	7	8	9	10	11	12	13	14	15	16
Indicated Horse Power Developed	316	277	222	170	118	22	318	272	223	170	121	226	227	223	223	218
Degrees of Superheat							204.4	225.2	225.9	223.9	223.9	43.7	97.7	151.7	221.2	310.9
Consumption of Steam in Pounds per H. P. Indicated	13.43	12.64	12.08	11.48	11.84	13.52	10.71	10.25	9.83	9.59	9.50	11.58	11.00	10.67	9.81	8.89
Gain in Economy on the Basis of Actual Consumption of Steam												.04	.09	.12	.19	.26
Equivalent Consumpt'n of Steam per H. P. Indicated							11.64	11.18	10.74	10.43	10.36	41.77	11.44	11.33	10.69	10.01
Gain in Economy due to Superheating based upon Equivalent Consumption							.123	.121	.110	.104	.125	.024	.051	.060	.113	.174
Heat Units Required per I. H. P. per Hour	278	261	250	241	245	280	241	231	222	216	214	244	237	234	221	207

By equivalent consumption of steam is meant the reduction of the number of pounds of superheated steam used to the equivalent number of pounds of saturated steam of the same pressure, the reduction being made on the basis of heat units contained. The comparison of economy on this basis is consequently, perfectly equitable. The results, as will be seen, are certainly startling, as I do not know of any engine of this size which has as high an economy whether running with saturated or superheated steam, the best results being 11.48 pounds for saturated and 10.01 (equivalent) for superheated steam. It is also shown in the article mentioned that in several of the tests the steam was still superheated, both at the end of admission and of expansion, confirming the general statements in this respect made before in this paper.

Finally I come to the tests with superheated steam which have been made under my direction in the Steam Engineering Laboratory in the University of Wisconsin. The experiments were made with a 50-h. p. cross compound Nordberg engine, provided with poppet valves. The steam used was taken from the general boiler house of the University; but before being delivered to the engine it was passed through a superheater of the Schwoerer type installed near the engine. The superheater was, therefore, of the independent type and was fired with coke during these tests. By means of discharging compressed air under the grate it was possible to get any desired superheat up to 200 degrees Fahrenheit, and also to keep it fairly constant. The engine is used exclusively for experimental purposes, the power being absorbed by a prony brake.

The tests were made for the purpose of determining the gain in economy by the use of superheated steam at different degrees. In all, eighteen tests were made; four with saturated steam, four with steam superheated on the average of 50 degrees Fahrenheit, four of 100 degrees Fahrenheit, four of 150 degrees Fahrenheit and two of 200 degrees Fahrenheit. In the following will be given only the averages for each of the tests.

The cylinders are of 8-inch and 13-inch diameter and the stroke is 20 inches. During these tests it was run at 92 revolutions per minute.

	1	2	3	4	5
Indicated Horse Power	32.34	31.33	31.44	31.73	31.63
Brake Horse Power	30.27	30.31	29.76	30.35	30.31
Boiler Pressure, Gauge	90.1	93.9	92.0	97.6	95.6
Temperature of Steam, Deg. Fahr	331.0	380.5	431.2	483.3	525.9
Degrees of Superheat	.....	57.0	99.0	147.9	192.0
Steam in Pounds, Consumed per I. H. P. per Hour	22.78	20.89	21.22	19.1	17.05
Gain in Economy, in per cent, based on Consumption of Steam	.....	8	7	16	21
B. T. U. per I. H. P. per hour	416.00	391.00	402.00	373.00	338.00
Gain in Economy, in per cent, based on B. T. U	.....	6	3	10	19

The table shows plainly the increasing gain in economy with the increasing degrees of superheat. This increase is necessarily not as large when based on the number of B. T. U. used as when based on the number of pounds of steam used, but the gain is very large in either case when the degree of superheat is 192 degrees Fahrenheit, as in the last tests. I have no doubt, however, that it will be noticed that the gain is smaller for 99 degrees than for 57 degrees. I do not believe that this represents the true state of affairs, and hence I conclude that an error must have crept in in one of these tests, or perhaps, in both of them, which error, however, I have been unable to locate notwithstanding my best endeavors.

This paper has already exceeded the length which most persons can endure, and my conclusions, therefore, shall be very brief. It would seem from what has been stated before that it is time for our American engineers to pay a good deal more attention to the use of superheated steam than they have done heretofore. Some years ago we took a good deal of pride in the fact that our steam engines had shown the highest efficiency of any made in the world. This is not true any more; in this respect we have been left behind, just as we are behind at the present time in gas engine design and construction. This should not be so, but in order to regain our lost supremacy it will be absolutely necessary for us to arrange our boilers so that they can furnish highly superheated steam and to design our engines so that they can work properly with such steam. A beginning has been made in this country, but the movement must be accelerated and it is for this purpose that this paper has been written.

A COMPACT GAS ENGINE, BEAM TYPE.*

BY C. H. MORGAN, WORCESTER, MASS.

Mr. H. H. Campbell in his "Manufacture and Properties of Iron and Steel," facetiously defines the gas engine to be a "cannon with its projectile fastened to a crank shaft." With full appreciation of the delicious humor I cannot but feel that it comes a trifle late. It has been demonstrated at Winnington, Eng., that a well-constructed gas engine giving 114 indicated h. p. can run for 138 days without a stop, and for two years with only 3.4 percent of lost time, or 16,931 hours out of a possible 17,520 hours running time, with not a single cam or roller showing signs of heavy wear. The only parts renewed in two years were a set of piston rings, some valve springs and a small ignition valve, while the gas, air and exhaust valves looked as good as new.

If that is true the gas engine has either ceased to be a cannon or the projectile has become one of remarkable tractability and docility. It has been the pleasure of the writer to feel something of the possible future of the gas engine and to endeavor to add something to its development and perfection. This has been done collaterally to other and more pressing demands but always with unabated confidence and interest. In common with others the enormous gaseous wastes of the blast furnace and coke ovens has been a tempting field for research and exploitation. Mr. Campbell strikingly calls

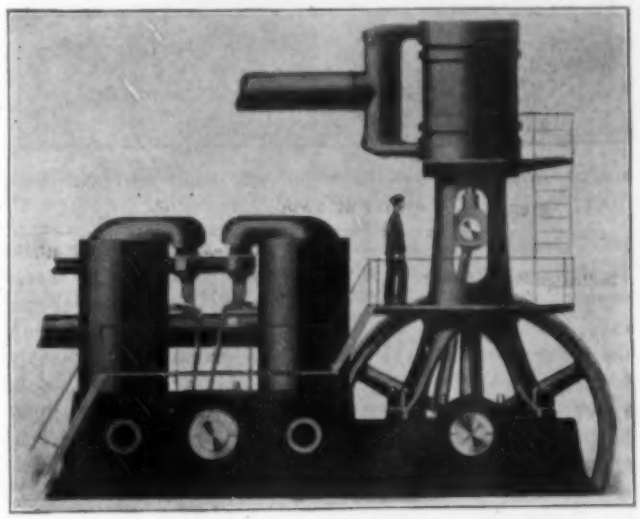


FIG. 1.—TWO CYLINDER GAS ENGINE OF BEAM TYPE.

attention to the fact that while the blast furnace is primarily a producer of iron it is a gigantic gas producer as well. He has made a valuable suggestion in his "Metallurgy of Iron and Steel." (See page 124.) He says: "It is quite possible that the exhaust gases from the gas engine can be profitably employed to heat the blast in the stoves of the blast furnace."

Like the dependence of the steam engine upon its boiler for uniformity and quality of steam so is that of the gas engine upon the producer for suitable gas. Nor is such gas easily obtained. Blast furnace and producer gas, especially the former, contain large amounts of dust which comes from the ores, limestone and ash, and which is driven out with the blast. This dust has been the *bete noir* of the gas engineer in attempted utilization of the gas. Clogging the checker work and flues when used for reheating, impeding combustion when burned under boilers, and cutting and grinding vital parts of the machine when used in gas engines. Various devices for "washing" or eliminating the dust had been devised, when, in the year 1900, German engineers discovered the value of passing the gas through a simple centrifugal fan blower injected with a small spray of water. The result has been exceedingly promising and when perfected will doubtless solve the troublesome problem. This engine operates on the two-cycle principle with an explosion at every downward stroke of the piston. Two compressors, one for gas and one for air, furnish the engine with its charges of gas and air, and provide air for scavenging. The exhaust is through ports

*Abstract of paper read at the New York meeting (December, 1903) of the American Society of Mechanical Engineers.

in the cylinder which are uncovered by the piston near the end of its downward stroke; thus avoiding the use of water-cooled exhaust valves and the mechanism which would be required to operate them. It can also be operated on the four cycle system by slight changes.

The engine has been designed with special reference to the use of such blast furnace and producer gases. The working

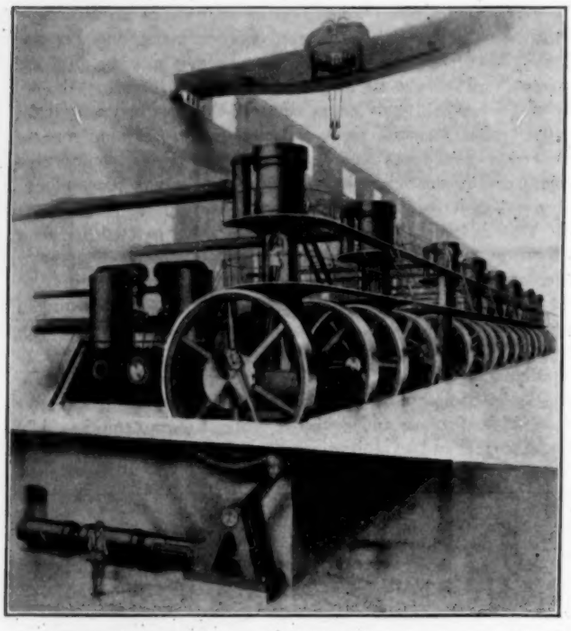


FIG. 2.—INTERIOR OF GAS DRIVEN BLOWING ENGINE STATION WITH UNITS OF 1500 H. P.

beam type of engine and bent lever beam have been chosen for the following reasons: It allows the cylinders to be placed upright, the balancing of the pistons and their connecting rods; it subjects the cylinder walls to much less pressure from the pistons, reducing the friction to a minimum. During the first half of the working stroke the average pressure of the piston on the walls of the cylinder is 100 pounds per square foot of surface. The bent lever beam also gives us the least pressure against the walls of the cylinder during that part of the working stroke when there is the highest speed of the piston, and also facilitates the lubrication of the piston and the piston connecting rod pins.

The John Cockerill Co., of Seraing, Belgium, who were

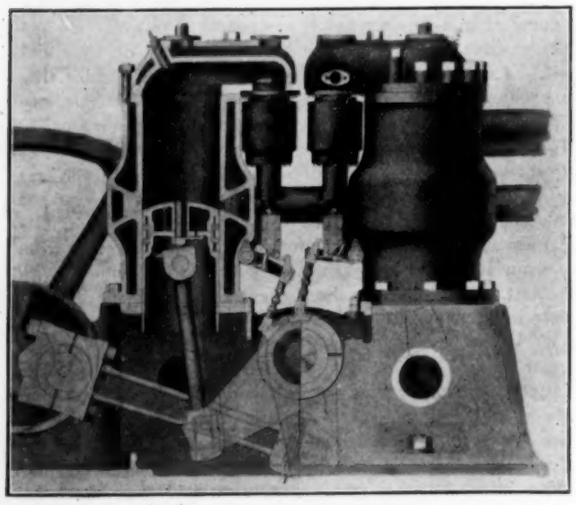


FIG. 3.—ELEVATION PARTLY IN SECTION OF BEAM ENGINE WITHOUT BLOWING TUB.

pioneers in the construction of large gas engines using blast furnace gas, purpose exhibiting a 3,000-h. p. gas engine at the St. Louis Exposition in 1904. An official statement gives the floor space to be occupied by this engine as 85 feet x 45 feet (3,825 square feet). A pair of engines of the beam type arranged for blast furnace duty with a capacity of 3,000 brake h. p., although of the same power as the Cockerill engine, require a space of only 24 feet x 32 feet (768 square feet), one-fifth the space. Each of the inlet valves of the engine is a combination of the mushroom or poppet valve and cylindrical valves with ports for gas and air, all the valves being arranged on one stem. The cylindrical valves have radial partitions which facilitate the mixture of gas and air before entering the cylinder, thus securing prompt ignition at the first part of the working stroke and a corresponding high efficiency. The air ports and poppet valves are opened in advance of the gas ports so as to thoroughly scavenge the cylinder. The proportion of gas and air can be varied while the engine is running by rotating the valve slightly upon its axis by means of a handle.

The valve gear is of the releasing or Corliss type, with dash pots to secure quiet closing. The valve gear is operated directly from the working beam without eccentrics or cams, which reduces the lubrication and care usually required in steam and gas engines. The valve trigger is under control of the governor which effects through its connections the tripping of this trigger at varying points in the stroke, as determined by the load on the engine. This tripping allows the valve to return to its seat, the dash pot preventing any shock due to closing.

Each cylinder of the engine is provided with two ignition or spark plugs so that in case of failure the current can be switched from one to the other without stopping the engine. The timing of the ignition, so that the spark may come before passing the center, at the center, or at an required part of the working stroke is accomplished by a movable disc which can be changed instantly to any required position when the engine is running at full speed.

Fig. 1 shows a two-cylinder engine of the beam type with two vertical single acting motor cylinders and one vertical double acting blower cylinder of 1,500 brake h. p. The connecting rods work on the same crank pin and are at an angle of 90 degrees, an arrangement of recognized merit.

Fig. 2 represents the interior of a power station with overhead traveling crane. The group of engines shown is made up of units of 1,500 h. p. each, using blast furnace gas and arranged for furnishing blast for the furnaces. Fig. 3 shows an elevation partly in section of the engine without blowing tub.

The United States Steel Products Export Co., which is the export company of the United States Steel Corporation, has been awarded the contract for the steel to be used in the construction of the electric traction, light and power plant to be built in Manila, Philippine Islands, by the Manila Electric Railroad & Lighting Corporation. Chas. H. Swift, of Detroit, Mich., is president of the company. Frank H. Buhl, ex-president of the Sharon Steel Co., is vice president. T. H. Reed, of the electrical, engineering and contracting firm of J. G. White & Co., New York, is secretary. George C. Smith, president of the Securities Company, of Pittsburg, Henry C. Conant, of Westinghouse, Church, Kerns Co., New York, Peter L. Kimberly, of Sharon, Pa., and J. G. White, of J. G. White & Co., are also largely interested. The corporation has taken over the horse and steam lines traversing the Philippine capital. These lines will be converted into electric traction and additional lines will be built, which will make in all about thirty miles, to be under the control of the American corporation. The initial capacity of the power house will be 3,500 h. p. There will be three 750-k. w. Westinghouse turbines. One hundred cars are to be operated by Westinghouse motors. Wonham & Mayer, Morris building, New York, are supplying the rails, which will be manufactured in Europe. The condensers will be built by the Alberger Condenser Co., New York. The boilers have yet to be contracted for. J. G. White & Co. have the contract for the construction of the road, which is expected to be in active operation inside of twelve months.

J. C. Gilchrist, Cleveland, who owned the controlling interest in the Empire Shipbuilding Co., Buffalo, has sold his interest to John Bateman and other Buffalo stockholders of the company. The capital stock of the company was increased recently for the purpose of enlarging the plant.

NEW LATHE AND PLANER TOOLS.

The three illustrations show the new line of side tools for lathe and planer use brought out by the Armstrong Bros. Tool Co., of Chicago. The holder is drop forged of steel and is case hardened. The cutters are made of self-hardening steel and are of good size and shape to withstand the heavy strains to which a tool of this kind is subjected. The cutters are held close up to the end and the grip is quite effective when the tool steel is used up to a very short length. The cutters taper upward in cross section and are wide on the lower part; top and bottom are beveled to fit dovetailed groove in holder and securely held in place by a binder bolt set flush. The tools are made in many sizes, straight and offset, right and left

TOOL HOLDER IMPROVEMENT.

hand and sent out with drop forged wrench and a self-hardening steel cutter, ground to shape.

The maximum boiler horsepower in central power stations is only attained during a few hours of the day. During the greater part of the day the capacity required is much less than this maximum. On this account it has been found economical and practical to design the boilers and chimneys of ample capacity for this load and to force them above and up to the maximum by means of mechanical draft. In the new power station of the Denver Tramway Power Co., of Denver, Colo., mechanical draft is used as an auxiliary to the natural draft provided by a chimney 240 feet high. Artificial draft is furnished by three Sturtevant electrically driven steel plate fans. The boiler capacity of the plant is approximately 9,000 h. p.

Among orders for machinery and equipment recently placed in the United States for shipment to Mexico were the following: Twenty cars for the National Tehuantepec Railway Co., with the Pressed Steel Car Co., of Pittsburg; for machine tools, with the Niles-Bement-Pond Co.; an order for locomotives, with the H. K. Porter Co., of Pittsburg. The Philadelphia Pneumatic Tool Co. has also booked an order for its specialties, and the John A. Roebling's Sons Co., of Trenton, N. J., and Robert Wetherill & Co., of Chester, Pa., respectively, have given orders for wire and driving engines for sugar mills.

At the annual meeting of the American Society of Civil Engineers, held in New York City last week, it was decided to submit to a letter ballot of the members of the society the question of accepting, on behalf of the society, the offer of Andrew Carnegie to give $1,000,000 toward a union building in New York for this and other engineering associations. The constitution of the society requires that a vote shall be taken. Mr. Carnegie has offered to increase the offer to $1,500,000, if the Civil Engineers unite with the other societies.

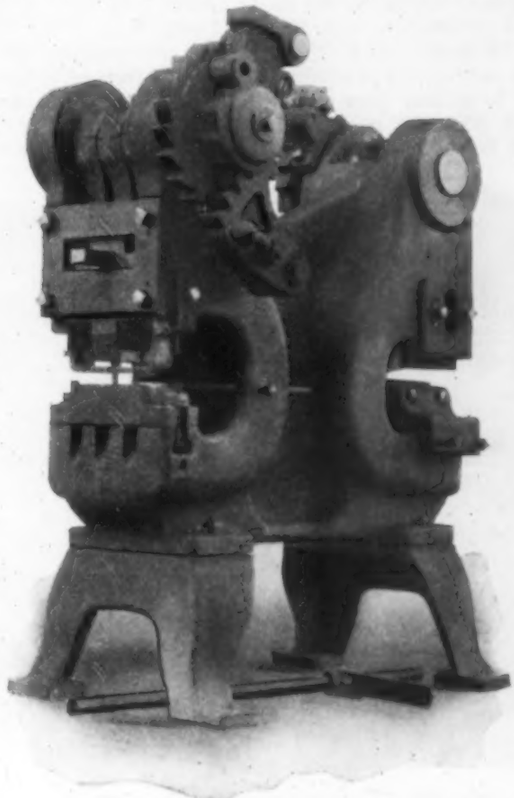
It is reported in New York that the Pennsylvania Railroad Co. will reject all bids submitted on Dec. 15 for the construction of its tunnel under the East and North rivers. The bids are said not to be satisfactory to the engineers of the company and it is thought that it will either do the work itself or call for new bids.

The American Bridge Co. has secured a contract for the structural material to be used in the huge reduction works to be built at Cerro De Pasco, Peru, by the Cerro De Pasco Mining Co. About 1,000 tons of steel will be employed.

COMBINED PUNCH AND SHEAR.

This machine is built for hand or belt power and is what is known as a double-header, having a cutting-off shear on one end and a triple punch equipment at the other. The three punches work independently of each other and the three sizes may be always ready for use. The device is so constructed that by inserting a sliding key in the different key holes on top of the machine any one punch can be operated independently of the others and on the other hand, inserting keys in all three holes all the punches may be in operation at the same time. All lost motion or wear can be taken up positively and thus avoid possible chance of breaking dies or punches. The length of lever required for this machine is but 36 inches, and at full capacity the tool is easily operated.

The tool will cut flat iron ½ x 4 inches, or round iron 1 inch in diameter, will punch a ½-inch hole in ½-inch iron



A COMBINATION PUNCH AND CUTTING-OFF MACHINE.

and weighs about 1,000 pounds. It is manufactured by the Badger State Machine Co., of Janesville, Wis.

Announcement has been made at Sydney, C. B., by the Strait of Canso Bridge Co., that a Kansas City firm of engineers has been commissioned to prepare plans for the proposed bridge across the Strait of Canso. The cantilever span will be 1,800 feet and will rest on two abutments of steel, 40 feet in diameter. The length of the bridge will be 3,300 feet. Thirty-five thousand tons of steel will be required and the estimated cost is $5,000,000.

The Aultman-Taylor Machinery Co., Mansfield, O., has filed a $50,000 damage suit against Daniel Webster, superintendent of the boiler shops since 1896, charging that he caused to be made working drawings of the company's Cahall horizontal boilers for the purpose of using them in competition with the company.

The Automatic Feeder Corporation, Derby, Conn., has been incorporated with a capital of $200,000.

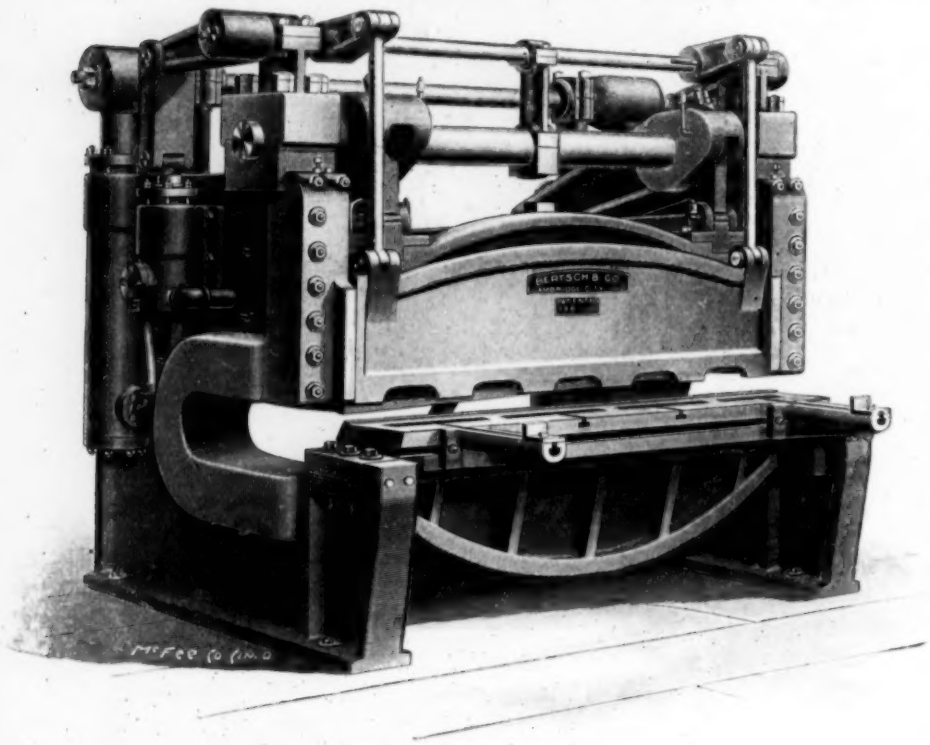
The Union City Foundry, Erie Co., Pa., has been incorporated with a capital of $25,000.

IMPROVED HYDRAULIC PLATE SHEAR.

The illustration represents a 10-foot patented hydraulic shear with 30-inch throat for cutting ¾-inch plates. This shear has a cylinder on each housing with the rams connected directly to the rock shaft, by levers. The cylinders are connected and the water governed in such a manner that the pressure is equal in both cylinders when cutting. Shorter shears for lighter work have but one cylinder.

The makers, Bertsch & Co., Cambridge City, Ind., manufacture various types of shears but assert that this hydraulic shear has several advantages over a geared machine as it can be stopped, started or reversed at any part of the cut. The castings and connections are strong enough to withstand a greater strain than the maximum pressure attainable from the cylinders, consequently the shear will simply choke with the lapping of blades or introduction of any metal of undue thickness and stop without damage. It is guaranteed to be perfectly safe against any such accidental breakage.

The cylinders take water in one end which is cut off the instant the stroke is made. The knife bar or cross-head and hold-down are returned by gravity. No water is required to hold them in position when not in motion and no water is used except when the machine is actually cutting. The hold-down is operated automatically and adjusts itself to any



A NEW HYDRAULIC SHEAR.

thickness of metal. When factories are not supplied with hydraulic pressure a pump is furnished with the machine and connected for the continuous use of a small amount of water or oil. This machine is made any length from 6 to 14 feet, with any depth of throat from 18 to 36 inches, for plates of any thickness from ½ to 1½ inches, and varies accordingly in weight from 30,000 to 150,000 pounds.

The Pennsylvania Steel Co. has received a contract for 7,500 tons of 100-pound rails to be used by a railway in the Argentine Republic. The price has not been disclosed, but it is known it was obtained in competition with English, Belgian and German manufacturers. The rails will be rolled at the Sparrow's Point plant.

Six mills of the Pope Tin Plate Co., Steubenville, O., have resumed operations. The plant had been closed since Dec. 18. Only five mills had worked up to that time from Nov. 2, when the mill resumed after a long shutdown.

The Syracuse Machine & Tool Co., Fayetteville, N. Y., has been incorporated with a capital of $50,000.

ARE PATENT LAWS ANY LONGER NECESSARY?

BY GEORGE W. DICKIE.

Only one week ago the secretary of this society requested that I should prepare a paper for this meeting, and this subject was in my mind at the time; in fact, a patent attorney was waiting to consult me in regard to evidence required to defend a suit for alleged infringement of a patent, one of a class now so numerous, where the principal novelty is in the combination of words that describe the claims. Patents appear to have had their origin in the ancient practice of giving to favorites monopolies or special privileges in connection with the making or vending of such things as they deal in by the reigning prince in absolute or restricted monarchies. The evil practice worked great hardship on the less-favored body of purchasers and consumers, and trade was thereby greatly restricted. The British people forced from the unwilling James I a statute declaring void all these burdensome monopolies, with the distinct exception regarding letters patent and grants of privilege as follows: "Sole working or making of any manner of manufacture within the realm to the true and first inventor of such manufacture, which others, at the time of making such manufacture, should not use, so they be not contrary to law, nor mischievous to the state by raising of the price of commodities at home, or hurt of trade or generally inconvenient." These words form the foundation upon which has been built the whole structure of the law of letters patent.

The inventions for which patents are granted are either vendible articles, such as machinery or apparatus, or processes. A mechanical principle cannot be the subject of a patent unless its application to some useful end be shown. The principal classes of patents seem to be granted on:

First. New contrivances that produce new results.

Second. New contrivances that produce old results.

Third. New combinations of old and well-known parts, whether the combination relates to the operation or to the result.

Fourth. New methods of applying a well-known device.

The spirit of the patent law is that the benefit or improvement must be manifest and of importance with regard to claims for patents touching well-known objects and processes, and great skill is sometimes displayed in so wording a specification as to bring this requirement into prominence, the object of the law being that the rewards to come to the patentee will be a just recompense to him for his labor in the wide sense that though his labor may not in itself have amounted to much, though the change in process or application be small, still, if the general scope and utility of application or process, or whatever the patent may cover, be enlarged to the benefit of the public, the inventor (though in this case only an improver) is entitled to a just reward for his discovery, and this reward his patent gives him an opportunity to secure. In the case, which often happens, of a party making some discovery not already patented, but openly used by someone else, though not to his knowledge, no patent is allowable, but should the discovery have been previously made and be kept secret, then the party who first obtains a patent is the legal inventor, irrespective of priority of invention on the part of any second party. In Great Britain a patentee may be compelled by law to grant licenses to persons to work his patent should they be able to prove that the public is being defrauded of the use of the patent.

The whole reason for the existence of patents is the monopolizing by the inventor, for a limited period, of the benefits derived from an invention, on the supposition that there will result a lasting benefit to the public after the term of the patent has expired. A very small percentage of the patents granted meet this condition, for, to do so, they must cover

*Read before the Technical Society of the Pacific Coast.

real inventions. The mechanical arts have reached such a stage of development that new combinations of mechanical devices, in the sense of invention, is hardly possible, and, in my opinion, a patent should be issued only where some new contrivance has been invented to produce a new result. I would not have any real inventor go unrewarded, but, in order to recompense the few inventors who have done work worthy of recognition by their fellow-men, it should not be necessary for the public generally, and the mechanical arts in particular, to carry the huge load of patent-protected devices of all sorts described in patent specifications, which, owing to cleverly worded claims, prevent a free application of the proper device to accomplish the end in view.

I have reached my present position on the patent question through experience in my daily task of continually seeking the best mechanical means to accomplish the end in view. In order to illustrate the kind of patent that stands in the way of progress, seeking to exact royalty on claims that should never have been allowed, I may cite a case where the holder of a patent is at present claiming damages from the company with which I am connected for alleged infringement of the claims on which he has been allowed a patent:

In 1898 the United States Navy Department issued specifications for three battleships. On page 37 of that specification there is the following requirement: "Lifting gear to be provided for all armored hatch covers which can be worked by hand power from above and from below. Such shutters and doors of armor as may be directed are to be fitted to be opened and closed by electric power, the electric power appliances to be worked without disconnecting the hand gear." And on page 49 there is the following requirement: "The principal sliding water-tight doors below the protective deck, as directed, to be operated on an approved system by power, each such door to be capable of being operated by hand or power from either side, and all to be capable of being closed simultaneously from a distance by power from two stations located as directed. The distance control must not incapacitate each door from operation on either side at the door by power."

A company had been making doors for such use under patents. These were at first hydraulic doors, but after some experience with them new patents were obtained for doors operated by air, and now this company has bought or otherwise secured patents for doors operated electrically. The claims under these patents are all very broad and cover the combination of a door, the bulkhead to which the door is secured and the mechanism for operating the door. Now, bulkheads are not new, doors secured to bulkheads are not new and mechanism to operate doors attached to bulkheads is not new. But to come back to our case: In October, 1898, the contract for one of these three battleships from whose specification I have quoted was awarded to the company with which I am connected, and, after the more important matters connected with the beginning of such a contract were attended to, I began to consider how I would meet the requirements of the specification as to doors and hatches to be operated by power.

Some time in December, 1898 (exact date unknown, for we never consider that what we do at any time may be required as evidence in a patent case), I talked this thing over with our electrician and decided to operate these doors and hatches by electric motor, using the ordinary vertical sliding door frame and screw, simply taking the doors we had been making for years, applying a special motor to operate the screw and using the control devices that we had for other purposes, it never occurring to us that any invention was required to meet the case.

We could not start the plans for these doors for some time, owing to press of other work. I find, however, that on Feb. 13, 1899, I wrote the president of our company, who had sent me a proposed plan from the other company offering their hydraulic doors for use in this battleship, as follows: "The number of vertical sliding doors for the ship has not been determined, nor what number of them should be operated by any power system at a distance. Our intention is to devise an arrangement for operating them by electric power, and we will take it up as soon as we can possibly get at it. The prices given for these doors are altogether too great to make it advisable to think of using them." About this time I think that we must have begun to make plans for these doors, as the contemplated plan was signed and dated May, 1899. A sample door was made, and a sample portion of bulkhead to which the door was attached, the bulkhead being in the form of a tank, to test the water-tightness of the door. This was set up in the shipyard some time about July, and the door was thoroughly tested and found to operate very satisfactorily. Here again, I cannot fix dates, for it never occurred to me that I was inventing anything and that evidence would be needed to establish who the inventor was, there being nothing new about any of the devices used. When the door was found satisfactory, the plans were submitted in the usual manner and approved, and the work was started.

In November, 1899, I was in New York, attending the meetings of the Society of Naval Architects and Marine Engineers, and there learned that the naval constructor at the New York Navy Yard had been getting up an electrically-operated door to meet the requirements of the specifications from which I have quoted, and had a sample one set up at the yard. He invited me over to the yard to see his door and note in what way it differed from the one I had designed, so I went to see it and found that it also consisted of a combination of well-known devices, although differing from mine. He used a rack on the back of the door instead of a screw, the pinion gearing with the rack being carried on a shaft, which also carried a worm wheel, in which the worm on the motor shaft geared. This was not so simple as the motor direct on the screw, as I had it, and has not proved so effective. We talked freely about the difference in the doors, each trying to show the other where his door had the advantage, but neither said anything about being an inventor.

About a month after this the naval constructor made application for a patent on his door, with broad claims covering the combination of a bulkhead, a sliding door and motor, with controlling devices for operating the door. This patent was granted in 1900, sold or assigned to the before-mentioned company, which has started suit against the company with which I am connected for a large amount of damages and injunction against using the door I got out to meet the requirements of a Government specification. It may be said that such a suit will not be successful, but it will cost the company several thousand dollars for its defense.

I have stated this case at length because it is the best illustration I have at present of the kind of patent business that should be stopped. In this case (and it is representative of ninety-nine cases out of every hundred) there is no invention required. The door is the same as has been used for many years. The wedges that force it on the face when it reaches the proper positioin are the same as have always been used for that purpose. The screw that works the door, either vertical or horizontal, is the same as has always been used. When operated by hand it could be operated either at the door or at a distance. By and by a specification requires it operated by power, and I decide to do it electrically. For this purpose I use a motor such as we had used for telemeter purposes, gear this motor properly to the screw that operates the door, use well-known devices for controlling the movements of the motor, both at the door and at a distance, and in doing this it never occurred to me that any invention was required to combine these various well-known devices. At the same time a Government officer, knowing what this specification required, also took a door, such as had been used for many years, with the wedges to force it on the face when it reached the proper position, discarded the screw that had so long been used to work it by hand, fitted a rack on the door, a pinion to work in the rack and a shaft with a worm wheel on the shaft—a motor with a worm on its shaft to work in the wheel and with well-known controlling devices at the door and at a distance. After his door was finished it occurred to him that he had invented something in connection with it, and he applied for a patent with claims covering the whole combination. The patent was granted and then sold or assigned to the company that brings suit to recover damages from others who had the door in operation several months before any patent was applied for. Had I thought anything was being invented when designing this door, I could have applied for a patent several months before the other. Now an expensive defense must be made against the claim of the party holding this patent,

although, if invention were necessary to the securing of a patent, this party could not have obtained one.

I do not wish to be understood to be opposed to all patents. I believe in rewarding everyone who, by invention or skill, succeeds in making new combinations of well-known devices to accomplish results whereby the public will be ultimately benefited, and I would have such rewards liberal and sure; but patent claims cleverly worded to cover combinations of well-known devices—to accomplish well-known results obtained for business purposes—that are to prevent others from using the same combinations or mechanical equivalents I would abolish, and thereby stop 90 percent of the patent business, with decided advantage to the real inventor, who at present is lost amid the multitude of imitation inventors and patent sharps.

What I propose would hardly be received kindly by the general public. The general public's heart is quite soft in regard to such things. It is generally believed that the inventor is a mechanical genius who needs protection, pursued as he is by a host of designing capitalists trying to deprive him of the fruit of his labor, his only protection being the patent laws. The individual who touches the public heart as a struggling mechanical genius, who will be crushed if not protected, does exist, but he is very rare, and one of the reasons why he has no chance is because of the multitude of pretenders. Remove the vast accumulations of so-called inventions upon which patents have been granted which have neither merit nor novelty, then there would be some chance for the public to find the real inventor and reward him in such a manner as would ease the public conscience. This might be done b· either granting a patent where a real invention has been made (such a patent would have a value which under the present conditions is hardly possible) or the claims of an inventor could go before a commission composed of business men, each of high standing in his line of work, and so constructed as to cover the whole field of applied mechanics and processes of manufacture, who would administer to the inventor from the public purse a direct reward, which would be in proportion to the merit of the invention. There would, no doubt, be many objections to such a scheme because of the multitude of patents issued on what are not in any sense inventions, the holders of which reaping where they never did any sowing. All that multitude of patentees, including those whose business it is to prepare the way for inventors to obtain patents and protect them in the sole use of them, and the still greater multitude who expect to be patentees, although in no sense inventors, will have many objections to any method such as I propose, by which the real inventor might be able to bring himself into the light and receive a just reward for what he has done. It is because of this strong opposition that I have brought this subject before the Technical Society, in the hope that it may be fully discussed. Some of the most prominent men in the application of the mechanical arts to our industries are beginning to look for some way whereby this huge incubus can be lifted from the free use of mechanical combinations that have been free until some clever patent expert, whose client wanted a patent, was able to so word a claim as to tie up the use of some well-known device. It may be claimed that the examiners at the Patent Office are competent to protect the public from the evils I have pointed out, but these men know nothing of what is going on in the great industrial establishments, where the real inventions, that result in progress, are being made every hour of the day with no thought of protection from patents. The Patent Office examiner is concerned only to find whether someone has not patented the same thing or combination of things before. The real inventor has a harder time to satisfy the Patent Office expert than the combination man. The inventor must have something that is entirely new, something which the Patent Office, in all its years of collecting, has never had before, but the combination man has only to make a new arrangement of words to describe his claim. The courts also are supposed to protect the public against unjust patents, but, besides the expense involved in defending an action for infringement, there is the difficulty of procuring evidence of use. If one has to go back several years for it, it is often difficult to obtain. Drawings, made without any thought of their being required for anything except to get out the work by, are often found without date. Instructions are often given to carry out work in a certain way without any evidence being preserved of the when and why of such instructions. Those who are engaged every day in making all sorts of mechanical combinations to fulfill requirements in the specifications that describe the work under the various contracts they are endeavoring to execute have no visions of fortune through patents coming to them. They do not consider themselves inventors, and they never think of evidence in regard to their daily work. Yet these are the men who have advanced the mechanical arts to the place they occupy in the industrial world of today.

We are all more or less interested, either directly or indirectly, in patents. My side of this question is not the popular side. I have long felt it to be the right side. I have brought it forward at this time not on any sudden impulse. It has been a growing conviction with me for the past twenty years that a change is needed in the patent laws, and that this need is growing more urgent every day.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of Their Wants:—

The Central Car & Foundry Co., Vincennes, Ind., whose office is now at 28 Talbott Block, Indianapolis, advises us that it will not be ready for at least sixty days to furnish information as to its requirements in the way of equipment.

G. Nan-Treadle Co., New York, has been incorporated with a capital of $20,000 to manufacture machinery. The incorporators are: Louis Barth, L. Polucsek, Ed Winans, all of New York City.

The Tower Grove Foundry Co., St. Louis, has been incorporated with a capital of $6,000 by Fred W. Priess, Fred G. Schulz and Henry F. Welsch.

The Wise Furnace Co., Akron, O., with a capital of $50,000, has been incorporated by J. W. Myers, W. G. Wise, G. W. Carmichael, C. Morgan and H. E. Andrews.

The Dickison Engine & Power Co., Charleston, W. Va., has been incorporated with a capital of $10,000 by W. A. and G. H. Moffett and A. S. Dickison.

The Co-operative Pneumatic Tube Co., New York, has been incorporated with a capital of $100,000 to manufacture machinery for pneumatic tube works. The incorporators are: H. C. Speidel, Poughkeepsie; Ed A. Cook, G. J. Cook, New York City.

The Colonial Iron Co., New York, has been incorporated with a capital of $150,000 to deal in iron and iron ore. The incorporators are: H. H. Adams, Wm. W. Vanderbilt, Lee A. Agnew, all of New York City. Directors are: H. H. Adams, W. W. Vanderbilt, E. V. B. Hoes, all of New York City.

The Walsh Brake Shoe & Foundry Co., Chicago, has been incorporated with a capital of $100,000 to manufacture machinery. The incorporators are: Julius Moses, Hamilton Moses, F. J. Noonan.

The Fay & Bowen Engine Co., Geneva, N. Y., has been incorporated with a capital of $40,000. The directors are: W. L. Fay, E. S. Bowen and Henry Brewer, of Geneva.

The Automatic Feeder Corporation, New Haven, Conn., has been incorporated with a captial of $200,000 to manufacture feeders for tack, nail and other machines. The incorporators are: Edward A. Harriman and William L. Barnett, of Derby, and S. Bigelow Cheney, of New Haven.

The Shattuck-George Iron Co., Wichita, Kan., has been incorporated with a capital of $30,000.

Additional machinery is to be installed at the mine located near La Cruz, State of Nuevo Leon, and owned by George H. Richards, of Terre Haute, Ind., and associates.

The Central Railroad & Bridge Co., Council Bluffs, Ia., has been incorporated with a capital of $10,000 and with authority to increase the capital to $3,000,000; the object being to operate a railroad in Iowa and construct a bridge across the Missouri river. The officers are: A. Wadsworth, of Council Bluffs, president; Abram Sebring, of New York, vice president; and C. C. Clifton, of Council Bluffs, secretary.

The Standard Pulley Co., Cincinnati, has been incorporated with a capital of $10,000. The incorporators are: Chas. Stan-

ley, Joseph F. Jewett Jr., J. F. Jewett, I. E. Rush and Arthur Espy.

The Steel Building & Construction Co., Chicago, has been incorporated with a capital of $15,000. The incorporators are: F. R. De Young, Wade Garfield, and H. H. Reed.

H. O. Nelson Iron Works, Knoxville, Tenn., have been incorporated with a capital of $15,000. The incorporators are: H. O. Nelson, A. H. Nelson, W. F. Simpson, John C. Goff and James H. Welcker.

The Thompson-Pitts Foundry Co., Dubuque, Ia., has been incorporated with a capital of $6,000.

The W. B. Steele Construction Co., Portland, Ore., has been incorporated with a capital of $1,000 to erect bridges, buildings, and wharves. The incorporators are: W. B. Stelee Sr., W. B. Steele Jr., and D. E. Steele.

The Williams Air Compressor Co., Indianapolis, organized for the purpose of manufacturing air compressors for engines and locomotives, has been incorporated with a capital of $40,000.

Practically all of the $20,000 stock of the Warren Independent Steel Co., Warren, Ill., has been subscribed. The first meeting of stockholders for organization will be held Jan. 29, at which time it is expected the location of the plant will be decided upon.

The Birmingham Safe Co., Birmingham, Ala., has been incorporated to manufacture and repair iron safes.

Fires and Accidents:—

The large wagon works and foundry of the Ruka Bros. Mfg. Co., at Boscobel, Wis., was recently destroyed by fire with a loss of $15,000.

Fire damaged the plant of the Independent Iron & Wire Co., Hall and Branch streets, St. Louis, Jan. 19, to the extent of $4,000.

Fire in Tarrant's Foundry, 36 Indiana street, Chicago, Jan. 20, resulted in a number of firemen receiving severe burns, and in the loss of $2,500.

Fire at the plant of Brown & Miller, Jersey City, N. J., Jan. 21, caused a loss of $150,000. The company manufactures marine machinery. In the same building the following firms suffered loss from fire: Rossiter, McGovern & Co., machinists; Holmes Burglar Alarm Co.; Ernest A. Gibbons Co. manufacturer of bolts and machine supplies; Cushing Electrical Supply Mfg. Co.; A. Thompson, pattern maker; Arthur J. Hull, machinist; J. G. Hendrickson, machinist; George White Machine Co., and Louis D. White, machinist.

Fire in the plant of the Northwestern Foundry Supply Co., Detroit, caused a loss to building and stock estimated at about $12,000.

New Construction:—

Excavation is now being made for the foundation of the new plant of the Eclipse Rolling Mill & Mfg. Co., Birmingham, Ala. Machinery has been ordered.

The Boozer-Gotshall Co., Waterloo, Ind., contemplates adding a foundry to its plant.

The new plant of the Todd Mfg. Co., New Albany, Ind., has been completed. The company purchased eight acres at New Albany and erected thereon a chain factory 50 x 280 feet, one story, and a frame factory 50 x 280, two-stories. The power plant was erected separately from the other buildings with two 100-h. p. Root boilers. The company is manufacturing largely Mock's steel hames which it sends to different parts of the globe. It manufactures chains of all kinds and wood hames, also manufactures harness rings and other harness hardware. It has one of the best equipped factories in the country for the class of goods it is turning out. It has put in an Acme gas plant as a test and has done away with coke as a fuel for chain and hame fires.

The National Iron Co., of St. Louis, Mo., has commenced the erection of a plant at East St. Louis, Ill., adjoining the St Louis locomotive plant. The new plant is intended for the manufacture of small castings.

The University of Illinois, at Champaign, Ill., is about to erect a new foundry at a cost of $10,000.

The Alamo Mfg. Co., Hillsdale, Mich., whose foundry was recently burned, expects to rebuild with the least possible delay. It will build on a somewhat larger scale than originally, but its plans are not yet quite complete. This company has recently increased its capital from $200,000.00 to $500,000.00. It is looking forward to a prosperous year.

The Hopke Foundry Co., Rockford, Ill., has completed its new foundry which replaces the one recently destroyed by fire. The building is 70 x 100 feet and new equipment has been installed throughout.

Price & Evans, Chattanooga, Tenn., have begun to rebuild their foundry which was recently destroyed by fire.

The Frankfort Brass Works, Frankfort, Ind., which recently suffered a $3,000 loss from fire, will rebuild and enlarge their plant.

Indiana newspapers state that the Nicholson File Co. will make improvements to its plant at Anderson, Ind., which will involve an expenditure of $300,000 and that the Beaver Falls plant will be moved to Anderson. The company declines to make a statement for publication.

The Purcell Foundry & Machine Co. is planning to build a new foundry at Purcell, Mo. This is located in the mining region in a place where a foundry has been needed for some years.

The Union Pacific railroad is planning to build a new foundry 102 x 264 feet in connection with its shops at Omaha, Neb.

O. P. Chatfield, of Escanaba, Mich., is about to erect a new brass foundry and core oven in connection with his plant at Escanaba. Mr. Chatfield also has a brass foundry at Marinette. He expects to run the latter through the winter, after which it will probably be closed or sold, or transferred to the Escanaba plant.

The Gustin-Bond Axle Co., Sullivan, Ind., advises us that it will build as soon as weather will permit, but can not now give details of plans. The company was recently incorporated.

The Oneida Steel Pulley Co., Oneida, N. Y., is increasing its capital from $125,000 to $300,000. It is also preparing plans to build an addition to its building 80 x 80 feet. It has the most of its equipment for the building except a line of presses. The company has closed arrangements whereby its product for the year is practically sold in both all wood and all steel pulleys.

The International Mfg. Co., Columbus, O., whose recent incorporation has been mentioned, will enlarge the business in every way, developing the foreign trade in cash registers more thoroughly than ever before, and adding to the present facilities and equipment. The company does not expect to build a new plant complete, but will add to the present buildings and machinery. The demand for the Hallwood cash register has grown to such an extent that the facilities of the Hallwood Co., which has been taken over by the new concern, proved entirely inadequate. The officers of the International Mfg. Co. are: Geo. W. Sinks, president; W. T. Wells, general manager; and Howard C. Park, secretary and treasurer.

W. H. Harris, proprietor of the Harris Foundry, Lockport, N. Y., has perfected and patented an improved furnace for house heating, and will build a plant 150 x 100 feet in which to manufacturer the furnaces. About 100 men will be employed in the new plant.

Plans are being completed at the Union Pacific railroad offices for a foundry 102 x 264 feet, to be erected at Omaha, Neb.

The Indiana Union Traction Co., Anderson, Ind., has approved plans for car barns and repair shops to be located in that city. The car shops will cost $150,000.

The McClintic-Marshall Construction Co., contractor, has finished the iron frame work on the buildings of the Delaware River Steel Casting Co., Chester, Pa. Bricklayers are now at work and the new buildings will be pushed to completion as rapidly as possible.

The Pittsburg and Valley Districts:

The plant of the Riverside Bridge Co., Martins Ferry, O., was partially destroyed by fire this week entailing a loss of $25,000. The fire originated from an explosion of natural gas.

Owing to high water, the mills located along the Allegheny river in both Pittsburg and Allegheny, were compelled to suspend operations last Friday. Some of the mills located on

the Monongahela in Pittsburg were also compelled to suspend, but in no case were they prevented from resuming operations this week. At Wheeling, W. Va., considerable damage was done by the Ohio overflowing its banks, and the mills of the National Tube Co. and the Wheeling Steel & Iron Co. were compelled to suspend operations temporarily. At New Castle, Pa., a few mills were compelled to suspend, but at Sharon little trouble was experienced despite the high water. Some of the operating mills in the Youngstown, O., district were also compelled to shut down Saturday, but as the water receded on Sunday nearly all the mills were enabled to resume in full this week.

The Westinghouse Electric & Mfg. Co. and the Westinghouse Machine Co. are now installing machinery in the extensive electric service plant which will provide power for the St. Louis World's Fair grounds this year. The capacity of the plant will be 8,000 k. w. The steam engines for this plant are being furnished by the Westinghouse Machine Co. while the engineering and construction of the plant is being done under the supervision of Westinghouse, Church, Kerr & Co. The plant will contain four units of 2,000 k. w. each. The engines will be Westinghouse vertical, cross compound, condensing Corliss, running 83 r. p. m. They are rated at 2,800 h. p., and have a maximum overload capacity of 5,200 h. p. The latter capacity is reached at three-quarter cut-off in the low pressure cylinder. In addition to the fields of the generators the flywheels of the engines weigh 175,000 pounds each. Sixteen boilers of 500 h. p. each will supply the steam.

The annual meeting of the stockholders of the Harbison-Walker Refractories Co., Pittsburg, was held last week and the following directors elected: S. P. Harbison, S. C. Walker, W. W. Croft, J. B. Cullum, O. M. Reif, L. C. Turley, E. M. Allen, George W. Reese, H. F. Bigler, A. Paterson, T. H. Given, A. P. Green, W. A. Stanton, T. L. Chadbourne, and Hay Walker Jr. Officers were elected as follows: Chairman of the board, S. P. Harbison; president, A. C. Walker; first vice president, H. W. Croft; second vice president, J. B. Cullum; third vice president, W. A. Stanton; fourth vice president, George W. Reese; secretary and treasurer, Hamilton Stewart.

The wire and wire nail plant of the American Steel & Wire Co., Sharon, Pa., was placed on double turn this week.

The old rail mill at the Edgar Thomson plant of the Carnegie Steel Co., Braddock, Pa., which rolls light sections, was placed in operation this week.

Chas. Herman & Son, Sharpsburg, Pa., manufacturers of the pneumatic jarring molding machine, have received four orders for machines from England. The demand from foundries in this country is also reported heavy.

The Beaver Valley Metal Co., New Brighton, Pa., last week made a large bronze bearing for the Mesta Machine Co., Pittsburg, Pa., which weighs 2,500 pounds. The casting is 3 feet 8 inches long, 2 feet 6 inches wide and 12½ inches high and is to be used on a 26-inch shaft.

The Westmoreland Savings & Trust Co., of Greensburg, Pa., receiver for the Reese-Hammond Fire Brick Co., of Bolivar, Pa., has received an inventory of the properties of the company showing them to have a value of $915,609.59. No statement of the liabilities was filed, but it is understood that they are much below this figure and that the creditors will be paid off in full.

The Vulcan Foundry & Machine Co., New Castle, Pa., has been shut down on account of a lack of orders.

At a meeting of the stockholders of the Monongahela Coal & Coke Co., Pittsburg, held last week, directors were elected as follows: Francis L. Robbins, Henry W. Oliver, A. W. Mellon, J. B. Finley, S. S. Brown, George I. Whitney, George W. Theis, John A. Bell and W. R. Woodford. The annual statement shows profits for 1903, ending Oct. 31, after deducting expenses, bad debts and losses, of $3,713,369.83. Deducted from this were $606,347.12 for maintenance and repairs of river craft, $329,110.47 for depreciation, $568,080 for bond interest, $46,750 for accrued interest on bonds and $34,333.33 accrued interest on certificates of indebtedness, $266,203.90 reinvested in coal lands, $241,324.30 for retirement of bonds and $699,650 preferred dividends. This left $921,570.71 as the balance for the year, which with the previous balance of $1,037,097.84 gives total undivided profits of $1,958,688.55. During the year 193,221,674 bushels of coal were mined, compared with 165,146,819 in 1902, 151,291,197 in 1901 and 143,815,363 in 1900. The company purchased 3,301 acres on the Monongahela, exhausted 3,225 and sold 65. The report was signed by President J. B. Finley before his retirement Nov. 1. The company retired $118,000 bonds, leaving $9,350,000 outstanding.

The Whitaker-Glessner Co., of Wheeling, W. Va., has been organized with $2,000,000 capital. The properties merged include the sheet mills of the Whitaker Iron Co., and sheet mills, nail works and shovel works of the Laughlin Nail Co. The new company also acquires from the Whitaker Iron Co. a controlling interest in the Wheeling Corrugating Co., which will operate independently as heretofore, as will also the various departments of the Whitaker and Laughlin companies not included in the consolidation. The Portsmouth Steel Co., Portsmouth, O., owned by the Whitaker Iron Co., and the Laughlin Nail Co. were not taken over and will continue to operate independently. The officers are N. E. Whitaker, president; W. L. Glessner, vice president; and A. C. Whitaker, secretary and treasurer.

General Industrial Notes:—

The Alliance, O., plant of the American Steel Foundries has been closed down for an indefinite period. Up to December the plant employed about 800 men, but at the time of closing last week there were only about 300 employed.

The Vulcan Works, Chester, Pa., have secured a contract for making furnace fittings, flasks and other cast and wrought iron work for the Baldt Steel Co., New Castle, Del. The contract involves about 500 tons of material.

Maurice Weill has leased to the Francis Nygren Foundry Co. the two-story foundry building, 100 x 140 feet, at Fillmore street, near Rockwell, Chicago, for fifteen years.

The Bessemer department of the rail and blooming mills of the Pennsylvania Steel Co., Steelton, Pa., resumed operations Jan. 25.

The Ohio Iron & Brass Bed Co., Eaton, O., has resumed operations after being closed six weeks for repairs.

After several weeks' shutdown the gasoline engine works of Virtue, Pound & Winship, of Owatonna, Minn., have resumed operations.

The C. O. Bartlett & Snow Co., Cleveland, is in receipt of the following orders for elevating and conveying machinery: From the Iroquois Portland Cement Co., Caledonia, N. Y.; Elk Rapids Portland Cement Co., Elk Rapids, Mich.; Grasselli Chemical Co., Cleveland; Struthers Furnace Co., Struthers, O.; Sandusky Portland Cement Co., Sandusky, O.; Sherwin-Williams Co., Cleveland; Cleveland Gas Light & Coke Co., Cleveland; Farmers' Chemical Co., Cleveland; and the South Lorain Coal Co., Lorain, O.; also from the Rossland Power Co., Rossland, B. C., for mining machinery.

The Jamesville Mfg. Co., Jamesville, N. Y., recently incorporated, succeeds the I. A. Weston Co. and will manufacture and market automobile parts such as artillery and steel wire wheels, steering devices, steel rims, etc.; in the carriage or bicycle line, steel wire wheels, forged axle sets, ball bearing wood wheel bushings, steel rims, and bicycle and sulky hubs.

The old Darragh foundry, Bridgewater, Pa., has been sold to the Crawford-Speer Foundry & Machine Co. for $15,000. The members of the firm are: Mrs. Emma L. Crawford and W. R. Crawford, Allegheny; John D. Speer, of Pittsburg, and Oliver C. Speer, of Emsworth.

The Enterprise Foundry Co., Bristol, Tenn., has passed out of the hands of a receiver back into the hands of the George Brothers, the original owners. This plant was moved from Knoxville to Bristol about two years ago, and went into a receiver's hands about one year ago.

The Homestead Valve Mfg. Co., Pittsburg, Pa., has started up an iron foundry in connection with its brass foundry, and by the use of converting furnaces is able to make a superior semi-steel valve.

The George Foundry & Machine Works, Rome, Ga., have been sold to C. Turhune and Jerome S. Brown. The price paid for the plant was $20,000.

The Novelty Mfg. Co., Council Bluffs, Ia., has increased its capital stock from $25,000 to $100,000, and has begun the manufacture of the Brown patent lock-woven wire fence. An addition to the plant is to be built.

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Even if there is but little water carried out of the boilers with the steam, or if no chance is given for water to accumulate in the piping, there is always the condensation in the pipes to be looked after. This water—though there may not be enough of it to "bust" the engine—will lower the economy of the engine by robbing the steam of part of its heat, and it will also waste a lot of the cylinder oil by washing it out of the cylinder before this oil has done anything in the way of lubrication. A Cochrane Steam Separator should therefore be used, since it will take the water out of the steam and insure dry steam to the engine.

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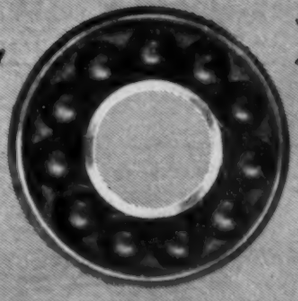

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General Offices at LEBANON, PA., U.S.A.

MANUFACTURERS OF

Merchant Bar Iron and Steel

(ANNUAL CAPACITY ABOUT 150,000 TONS)

ALSO EVERY VARIETY OF

Machine Bolts, Nuts, Washers, Turnbuckles, Lag Screws, Railway and Dock Spikes, Harvey Grip and other Railway Track Bolts. Boiler, Ship and Structural Rivets. Car Forgings and Rods and Irons for Bridges, Buildings, Etc., Etc.

This Company owns and operates the works formerly owned by J. H. STERNBERGH & SON, Reading, Pa. NATIONAL BOLT, NUT AND RIVET WORKS, Reading, Pa. LEBANON IRON CO., Lebanon, Pa. EAST LEBANON IRON CO., Lebanon, Pa. PENNSYLVANIA BOLT AND NUT CO., Lebanon, Pa.

The Upson Nut Co.,

Cleveland, Ohio,

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MACHINE
PLOW
SPRING
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FANCY
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HOT PRESSED
COLD PUNCHED
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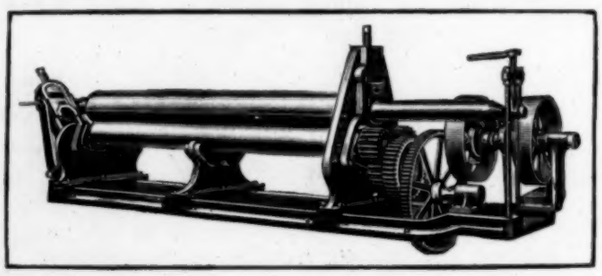

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